REVISE
.wales

F2.05 — Four operations with decimals & negatives

Mark schemes for the F2.05 question pack

Spec 1.5.1, 1.5.2, 1.5.3, 1.5.4 — Unit 2

SOLUTIONS · 2025 SPECIFICATION

Mark schemes for the 104 questions in the corresponding revise.wales question pack (221 marks total). Sources: legacy WJEC GCSE papers, WJEC SAM, and custom-authored mark schemes.

	OR 10, 11 and 18.			
6.(a)	−3, −1 and 1		B2	B1 for any two correct in the correct positions OR B1 for −5, −3 and −1 OR B1 for −1, 1 and 3.
6.(b)	4n + 3		B2	B1 for sight of 4n or n4 (but not $4n^k$ k≠1). Mark final answer

7. (a) (i) (x=) 8		B1	Accept embedded answers Mark final answer
7. (a) (ii) (y=) 64		B1`	Accept embedded answers Mark final answer
7.(b) 4k		B1	

7(a). $x + 2x + 3x + 90 = 360$ or equivalent.	✓	M1	Allow M1 for attempting sum of a + b + c + 90 with ratio a:b:c = 1:2:3 and clearly using trial and improvement to aim for a total of 360.
$6x = 270$	✓	A1	
$x = \frac{270}{6}$	✓	A1	F.T. from ax = b.
$= 45$	✓	A1	Allow SC2 for an answer of 15 (from '= 180')
7(b) Correct use of $2x = 90(°)$		B1	F.T. 'their value of x'. Must be used in justification.
'Yes' AND correct justification. e.g. 'Yes because of interior angles', 'Yes as lines are perpendicular to the base' 'Both A and B are 90'		E1	Dependent on B1 with F.T. justification. *Alternative method for the B1 mark* Use of $2x = 135(°)$ AND $x = 45(°)$

12. Showing (0·4), 0·15 and 0·35 OR 40% , (15%) and 35% OR 8/20, 3/20 and (7/20) OR three correct calculations for a common amount.		B2	B2 for all correct decimals, OR all correct %, OR all correct fractions with a common denominator, OR correct work using a common amount, OR a valid combination that allows full comparison. B1 for one correct conversion that still allows a full comparison. (i.e. allow one error in attempt at common format.)
15% 7/20 0·4 in order		B1	Allow any unambiguous indication. F.T. 'their work' if at least B1 gained. Unsupported correct answer gains B1 only.

17.(a) $x + 2x + 3x + 90 = 360$ or equivalent $6x = 270$ $x = \frac{270}{6}$ $= 45$	✓ ✓ ✓ ✓	M1 A1 A1 A1	Allow M1 for attempting sum of a + b + c + 90 with ratio a:b:c = 1:2:3 and clearly using trial and improvement to aim for a total of 360. F.T. from ax = b. Allow SC2 for an answer of 15 (from '= 180')
17.(b) Correct use of $2x = 90(°)$ 'Yes' AND correct justification. e.g. 'Yes because of interior angles', 'Yes as lines are perpendicular to the base' 'Both A and B are 90'		B1 E1	F.T. 'their value of x'. Must be used in justification. Dependent on B1 with F.T. justification. *Alternative method for the B1 mark* *Use of* $2x = 135(°)$ *AND* $x = 45(°)$

	'Both A and B are 90'.			*Use of 3x = 135(°) AND x = 45(°)*
18(a)	$\frac{40 \times 30}{200}$ OR $\frac{41 \times 30}{200}$ = 6 OR 6·15 or 6		M1 A1	Unsupported answer (M0) is also A0.
18.(b) (i)	454 680		B1	
18.(b) (ii)	842		B1	
18.(b) (iii)	5·4		B1	

	Second variable found.	✓	A1	
18.	$5{\cdot}64 \times 10^5$		B2	B1 for correct answer not in standard form e.g. 564000, or $56{\cdot}4 \times 10^4$. Allow B1 for $5{\cdot}6 \times 10^5$

4.(a) (i) 22 (cm)	B1	
4.(a) (ii) 18 cm^2	B1 U1	
4.(b) Rectangle 3 × 6	B1	Accept any rectangle with an area of 18 cm^2 which fits on the grid e.g. 4 × 4.5 FT 'their (a)(ii)'

		B0 if not a whole number.
8. (EC = Side of the square =) $\frac{28}{4}$	M1	*Lengths may be seen on the diagram.*
$= 7(\text{cm})$	A1	Any side of square shown as 7(cm) is M1A1.
(Area of triangle CDE =) $\frac{7 \times DE}{2} = 35(\text{cm}^2)$	M1	FT 'their stated or shown length for EC'.
(DE =) 10(cm)	A1	
Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical
Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.

	= 55 (°)	A1	C.A.O.
9.	(17 – 3) = 14	B1	Accept embedded (unsupported) answers e.g. 14 + 3 = 17 2.8 × 5 = 14.
	(14 ÷ 5) = 2.8	B1	FT their derived 14. Accept $\frac{14}{5}$ or $2\frac{4}{5}$ or equivalent. To be awarded the second B mark, candidates must provide their exact (unrounded) answer.

			Penalise incorrect notation (e.g. '19 in 30') −1.
12.(a)	$5x^2 - 2x - 3x^2 + 6x - 21$	B2	B1 for sight of $5x^2 - 2x$. B1 for sight of $-3x^2 + 6x - 21$. Brackets must be removed. Allow both of the above B marks even if not part of a single expression. *FT for B2 if at least two x^2 terms AND at least two x terms to be simplified.* *FT for B1 if at least two x^2 terms OR at least two x terms to be simplified.*
	$= 2x^2 + 4x - 21$	B2	If B2 not awarded, allow B1 for correct collection of 'x^2 terms' ($2x^2$) OR B1 for correct collection of 'x terms' (+4x). This 2nd B2 (or B1) is for their **final** answer. Any compensating errors leading to a 'correct' answer is B0. Penalise −1 for any attempt to equate their expression to zero (and attempting to solve) OR Incorrectly factorising.
12.(b)	$22 - f = 3 \times 6$ or equivalent. $22 - 18 = f$ OR $-f = 18 - 22$ $f = 4$	M1 A1 A1	 C.A.O. Accept 4 = f. M1A1A0 for $-f = -4$. Mark final answer. Allow all 3 marks for $\frac{22-4}{3} = 6$ with no further work. Allow 2 marks for $\frac{22-4}{3} = 6$ followed by '$f \neq 4$. If no marks gained. Allow SC1 for an unsupported $f = -4$.

17.(a) $x = 3{\cdot}2 \times \frac{8{\cdot}4}{5{\cdot}6}$ OR $\frac{x}{3{\cdot}2} = \frac{8{\cdot}4}{5{\cdot}6}$ or equivalent. $x = 4{\cdot}8$	M1 A1	M1 for correct use of linear ratio.
17.(b) $y = 6{\cdot}3 \times \frac{5{\cdot}6}{8{\cdot}4}$ OR $\frac{y}{6{\cdot}3} = \frac{5{\cdot}6}{8{\cdot}4}$ or equivalent. $y = 4{\cdot}2$	M1 A1	M1 for correct use of linear ratio. FT a slip in the calculation (not a misuse) of the scale factor in part (a) if used again in (b).
17.(c) Correct strategy of comparing corresponding ratio of lengths. Indicates that $\frac{3{\cdot}9}{6{\cdot}5}$ (= 0·6) is not equal to $\frac{5{\cdot}6}{8{\cdot}4}$ (= 0·666…) or equivalent.	S1 B1	Sight of 3·9 / 6·5 (or 6·5 / 3·9) along with any pair of corresponding lengths or scale factor used (or corresponding FT lengths from their answers in 17(a) or 17(b)). Allow using FT values from 17(a) or 17(b).
Alternative method 1 *(If CD = 3·9 then) RS = 3·9 × 1·5* *= '5·85 (cm)' or/and 'which is not 6·5'*	*S1* *B1*	
Alternative method 2 *(If RS = 6·5 then) CD = 6·5 × 2/3* *= '4·3… (cm)' or/and 'which is not 3·9'*	*S1* *B1*	

5.(a) $\frac{60 \times 300}{2000} = 9$ OR $\frac{59 \times 300}{2000} = 8{\cdot}85$ or $8{\cdot}9$ or 9 OR $\frac{60 \times 301}{2000} = 9{\cdot}03$ or 9	M1 A1	Must be seen. M0 for exact calculation. Do not accept any other approximated values. Unsupported answer is M0A0.
5.(b)(i) 19·437	B1	
5.(b)(ii) 34·1	B1	Accept 34·10

8.(a) 3	B1	
8.(b)(i) 	B1	A should be between 1/2 and 3/4 exclusive. B0 if no labels.
8.(b)(ii) 	B1	B should be between 1/8 and 3/8 exclusive. Award B1 if no labels and both marks are positioned correctly. [A should be between 1/2 and 3/4 exclusive.]

8.(a) (1 mile =) 8/5(km) or 1600(m) or equivalent	B1	For sight of a correct conversion e.g. 5 miles = 8km , 1 km = 5/8 mile. Allow more accurate correct approximations (for <u>all</u> marks) only if in the range [1609(m) to 1610(m)] . No FT from an incorrect conversion.
(Difference =) $\frac{8}{5} \times 1000 - 1{\cdot}5 \times 1000$	M1	Allow M1 for $\frac{8}{5} - 1{\cdot}5$ (= 0·1) or equivalent.
100 (metres)	A1	Allow –100 (metres). If no marks gained then allow SC1 for sight of (1·5 × 5/8)
8.(b) 4×100^2	M1	Also for alternative correct methods e.g. (A 4x1 rectangle followed by) a 400×100 calculation, 200 × 200, etc.
= 40000	A1	

15.(a)(i)	49	B1	
15.(a)(ii)	1	B1	
15.(a)(iii)	15	B1	
15.(a)(iv)	$\frac{1}{81}$	B1	
15.(b)	(n =) 30	B2	Allow for an answer of 2^{30}. B1 for sight of $2^2 \times 2^{28}$ or $2 \times 2 \times 2^{28}$.

15. All possible numbers shown with no extras. (11,12,13,14,21,22,23,24,31,32,33,34,41,42,43,44) OR Clearly justifies that there are 16 possible numbers from 4 × 4 = 16	B2	B1 for at least 10 correct and no more than 4 'extras'. 10 + 1, 10 + 2, etc and not added gain no credit.
(Probability multiple of 7 =) $\frac{3}{16}$ or equivalent. ISW	B2	F.T. 'their list' only if at least 6 numbers given which includes at least one multiple of seven. OR B1 for x/16 with x<16. B1 for 3/y with y >3. Penalise, −1, any incorrect notation e.g. '3 out of 16'. Unsupported 3/16 gains B0B2.

17.(a) $\frac{60 \times 300}{2000} = 9$ OR $\frac{59 \times 300}{2000}$ = 8·85 or 8·9 or 9 OR $\frac{60 \times 301}{2000}$ = 9·03 or 9	M1 A1	Must be seen. M0 for exact calculation. Do not accept any other approximated values. Unsupported answer is M0A0.
17.(b)(i) 19·437	B1	
17.(b)(ii) 34·1	B1	Allow 34.10

17.(a) 0·92 written on the 'Not a Saturday' branch. Sight of 1 − 0·15 − 0·45 OR 0·4 or 0·40 0·4(0) on both 'car' branches AND 0·15 AND 0·45 correctly shown on lower branches.	B1 B1 B1	Allow this B1 if shown on working lines.
17.(b) Sight of 0·08 × 0·15 OR 0·08 × 0·4 or equivalent. (P(Sat and 'plane or car') =) 0·08 × 0·15 + 0·08 × 0·4 or equivalent = 0·044 or equivalent. ISW	B1 M1 A1	FT 'their P(car)' if <1. 0·08 × 0·55 implies previous B1.
Alternative method (P(Sat and 'plane or car') =) 1 – (0·92 + 0·08 × 0·45) or equivalent = 0·044 or equivalent. ISW	M2 A1	FT 'their 0·92'. M1 for intent P(Sat and 'plane or car') = 1 – P('not Saturday') – P('Saturday and train')

18. Sight of at least two correct different surface areas. $2 \times (35 + 5x + 7x) = 142$ or equivalent. $x = 3$	B1 M2 A1	Sight of two of $35(cm^2)$, $5x(cm^2)$, $7x(cm^2)$. Allow M1 for 'sum of at least 3 correct surface areas = 142'. C.A.O. If M0, allow SC1 for $x = 3$ with no prior equation shown.

5(a) 481·63	B1	Do not accept 481·630
5(b) 64	B1	
5(c) 7	B1	Do not accept 7x7 or 7x7=49 alone.
5(d) (0)·03825	B1	
Ribbon mark 6(a),(b),(c),(d) 6(a) Football	B1	
Ribbon mark 6(a),(b),(c),(d) 6(b) 1/4 or equivalent ISW	B1	Do not accept incorrect notation; e.g. 1 in 4,1 out of 4, 1:4.
Ribbon mark 6(a),(b),(c),(d) 6(c) 1/4 × 60 15	M1 A1	Accept 15 out of 60. Award SC1 only, for a final answer of 15/60
Ribbon mark 6(a),(b),(c),(d) 6(d) Correctly labelled axes. Uniform scale starting from zero. Correct equal width bars for football, swimming and tennis.	B1 B1 B1	Vertical axis labelled 'number (of people)' or '*people*' or 'frequency' AND horizontal axis marked with the sports. Correct heights for 'their scale' (30 and 15) FT their (c) if possible: 'their swimming' = 'their tennis' AND either 'their football' = 2 x 'their tennis' or 'their football' = 60 – 2 x 'their tennis'. If no scale visible, allow final B1 for bars drawn in correct proportions.
7.(Number across = 20÷4=) 5 OR (Number down = 6÷2 =) 3 (Total number of small rectangles =) 5 × 3 15	B1 M1 A1	Sight of 5 or 3, not in incorrect statement or working FT 'their stated across and down' CAO
7. <u>*Alternative method*</u> *(Area rectangle A=2×4=) 8 (cm^2) OR* *(Area rectangle B=6×20=) 120 (cm^2)* *(No. of rectangle A=) 120 ÷ 8* *15*	B1 M1 A1	Sight of 8 or 120, not in incorrect statement or working FT 'their stated areas' CAO
Organisation and Communication	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means

WJEC GCSE MATHEMATICS (NEW)

SUMMER 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier		Mark	Comments
1.	(£)4.67 (£)5.84 (£)7.08 (£)1.45	B1 B1 B1 B1	
2.(a)	Pentagon	B1	
2.(b)	Rhombus	B1	Allow equilateral kite, but not kite or parallelogram.
2.(c)	Cylinder	B1	Allow circular prism.
3.(a)	(47,) 94, 141	B1	Ignore additional multiples.
3.(b)	52	B1	
3.(c)	209	B1	
4.(a)	Midpoint unambiguously indicated	B1	Allow +/- 2 mm.
4.(b)	Unambiguous parallel line drawn through C	B1	Allow +/- 2°.
5.(a)	9 (and) 16	B2	Allow 3^2 (and) 4^2. B1 for a sum of two square numbers less than 30 seen in workings or two square numbers less than 30 written on the answer line.
5.(b)	Accept suitable explanations, e.g. • the sum of three even numbers will be even (and 23 is odd) • when you add any amount of even numbers the answer is always even (whilst 23 is odd). • (23 is odd, but) even + even + even = even	E1	Allow • even + even = even, • because 23 is odd.
6.	FALSE TRUE FALSE TRUE	B2	For all four correct. B1 for 3 correct.
7.(a)	60 (%)	B2	B1 for equivalent fraction or decimal (0.6, 3/5, 12/20). If B2 not awarded, F.T. their fraction (except for ½, ¼ and ¾) correctly converted to a percentage for B1.
7.(b)	Multiply by 4	E1	Accept other correct explanations e.g. divide (the number) by 5 then multiply by 20, double (the number) and double (it) again or divide by ¼.
7.(c)	Accept suitable explanations, e.g. • 0.125 (is greater than) 0.1 • 5/40 (is greater than) 4/40	E1	Award E1 for other correct explanations e.g. a larger denominator means each part of the whole is smaller, or for correct evaluation of 1/8 and 1/10 of a chosen number.
8.(a)	65 (°)	B1	Allow ±2°
8.(b)	225°	B1	
8.(c)	(Small angle = 180 ÷ 6 =) 30(°) (Large angle = 5 × Small angle =) 150 (°)	B1 B1	Check diagram, though answer space takes precedence. F.T. 'their small angle' × 5 or 180 - 'their small angle ', provided answer is less than 180°. If no marks awarded, award B1 for both correct angles given in reverse.

<table>
<tr><td>8(a) $5p$</td><td>B1</td><td></td></tr>
<tr><td>8(b) (i) (x =) 8</td><td>B1</td><td>Accept embedded answer</td></tr>
<tr><td>8(b) (ii) (y =) 15</td><td>B1</td><td>Accept embedded answer</td></tr>
<tr><td>8(c) 19</td><td>B1</td><td>Accept 4 x 19 (= 76) or 19 x 4 (= 76)</td></tr>
<tr><td>9.
<table><tr><td>23 – (4 + 2) × 3 = 5</td><td>TRUE</td><td></td></tr><tr><td>7/10 + 2/5 = 9/15</td><td></td><td>FALSE</td></tr><tr><td>½ of 1/8 = 1/4</td><td></td><td>FALSE</td></tr><tr><td>25% of 0·4 = 0·1</td><td>TRUE</td><td></td></tr><tr><td>28 – 3 × 2 + 5 = 55</td><td></td><td>FALSE</td></tr></table></td><td>B3</td><td>For all 5 correct
B2 for 4 correct.
B1 for 3 correct</td></tr>
<tr><td>10.(a)
<table><tr><td rowspan="2">Type</td><td colspan="2">Yellow</td><td colspan="2">Blue</td></tr><tr><td><100</td><td>≥100</td><td><100</td><td>≥100</td></tr><tr><td>Num.</td><td>(8)</td><td>7</td><td>4</td><td>6</td></tr></table></td><td>B2</td><td>For all three correct.
B1 for 1 or 2 correct.
If no marks awarded allow B1 for all correct tallies seen.</td></tr>
<tr><td>10.(b) Any valid statement that indicates that the numbers (in the table) are added (to make 25)
e.g. ‘add the frequency’.</td><td>E1</td><td>Allow ‘add them up’.
Allow sight of ‘8 + 7 + 4 + 6 (= 25).’</td></tr>
<tr><td>10.(c) $\frac{8}{25}$ or equivalent ISW</td><td>B2</td><td>B1 for x/25 with x<25.
B1 for 8/y with y >8.
Penalise incorrect notation -1; e.g. ‘8 out of 25’, 8:25, ‘8 in 25’.</td></tr>
<tr><td>11.(a) −3
1</td><td>B1
B1</td><td>OR FT ‘their −3’ + 4.</td></tr>
<tr><td>11.(b)(i) 21</td><td>B1</td><td></td></tr>
<tr><td>11.(b)(ii) 191</td><td>B1</td><td></td></tr>
<tr><td>11.(c) Divide (the previous number) by 3.</td><td>E1</td><td>Allow ‘÷3’.
Do not accept n÷3.</td></tr>
</table>

9. Length of sides in Cuboid B = 5 (cm), 3(cm), 6 (cm) Volume of Cuboid B = 5 x 3 x 6 = 90 (cm^3)	B1 M1 A1	Award B1 for (height =) 6 (cm), provided length and width aren't also multiplied by 3. F.T. 'their height' x 5 x 3
Alternative method *(Volume of Cuboid A =) 5 x 3 x 2* *= 30 (cm^3)* *(Volume of Cuboid B =) 90 (cm^3)*	*M1* *A1* *B1*	 *F.T. for their stated or derived volume for Cuboid A'*
Organisation and Communication. Accuracy of writing.	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
10.(a)(i) Subtract six (from the previous term)	B1	Accept 'take away 6' or '(goes) down in 6s'. Allow -6. B0 for n-6
10.(a)(ii) Double (the previous term)	B1	Accept 'multiply by 2' or 'times by 2'. Allow ×2. B0 for n×2
10.(b)(i) x + 3	B1	Mark final answer.
10.(b)(ii) (£)15g	B1	Mark final answer. Accept 15 × g
11.(a) 28·34 or 1417/50 or $28^{17}/_{50}$ ISW	B2	B1 for sight of 23·04 OR sight of 5·3. If B0 allow SC1 for 28 or 28·3
11.(b) 34·8 or 174/5 or $34^{4}/_{5}$ ISW	B1	
12.(a) (19 − 18·2 =) 0·8	B2	B1 for sight of 19 OR sight of −18·2. BUT B0 for 19f − 18·2g. Mark final answer.
12.(b) 7x = 16 (x =) 16/7 (x=) 2·3 (to 1dp)	B1 B1 B1	 FT from 7x = k. Allow 16 ÷ 7 FT from any fraction that requires rounding. Mark final answer. (x =) 2·2…. implies B1B1B0. Allow an embedded 2·3, B1B1B0
13.(a) 4 hours 45 min	B1	
13.(b) 2·4 km	B1	
13.(c) 7km less than 5 miles — TRUE 1kg less than 2lb — FALSE 1 litre less than 1 pint — FALSE 8 litres less than 900cm^3 — FALSE	B2	For all 4 correct. B1 for 3 correct.

15. (Area of the triangle CDE =) $14 = \frac{4 \times CE}{2}$	M1	*Lengths may be shown on the diagram.* Accept equivalent e.g. $28 = 4 \times CE$.
(CE =) 7 (cm)	A1	
(Area ABCE = 7 × 7 =) 49 (cm^2)	B1	FT 'their stated or shown length CE'.
(Area of whole shape = 49 + 14 =) 63 (cm^2)	B1	FT 'their stated or shown area of square' + 14.
15. *Alternative method* *(Area of the triangle CDE =)* $14 = \frac{4 \times CE}{2}$	*M1*	*Lengths may be shown on the diagram.*
(CE =) 7 (cm)	*A1*	
(Area Trapezium ABCD =) $\frac{[(7 + 4) + 7] \times 7}{2}$	*M1*	*FT 'their stated or shown length CE (=CB)' consistently as 'their 7'.*
= 63 (cm^2)	*A1*	
16. (a =) $\frac{180 - 110}{2}$ or equivalent.	M1	
= 35(°)	A1	
b (= 180 – 90 – 35) = 55(°)	B1	OR FT 90 − 'their a'.
c (= 90 + 55) 145(°) OR c (= 180 − 35) 145(°)	B1	OR FT 90 + 'their b'. OR FT 180 − 'their a'

= 7240	A1	
18. x = 54(°) Opposite angles (of a) cyclic quad. (add up to 180°).	B1 E1	Dependent on an attempt at 180 – 126.
y = 108(°) Angle at the centre (is twice the angle at the circumference).	B1 E1	FT 2 × 'their 54' only if less than 360° Dependent on an attempt at 2 × 'their 54'.

2.(a)(i) 802	B1	
2.(a)(ii) 145	B1	
2.(a)(iii) 20	B1	
2.(b) 6·4 6·49 6·9 6·94	B1	

6.(a) 3 opposite 9 AND 5 opposite 7	B1	
6.(b) 4, 8, 28 Or 4,12, 24 Or 4,16, 20 Or 8,12, 20	B2	The values in the boxes take precedence. The numbers can be written in any order. B1 for any three multiples of 4 which are all different but do not add up to 40 (e.g. 4, 12, 20) OR which are not all different but do add up to 40 (e.g. 8, 16, 16). If boxes empty, then give credit as above for unambiguous answers in working space.

WJEC GCSE MATHEMATICS

AUTUMN 2019 MARK SCHEME

GCSE MATHEMATICS Unit 2: Foundation Tier		Mark	Comments
1.	72 150 52 59 168 158	B1 B1 B1 B1	
2.(a)	(44), 88, 132, 176, 220	B1	Ignore any additional multiples
2.(b)	33	B1	
3.	> < > <	B2	For all four correct. B1 for any three correct.
4.	(Perimeter of triangle = 14 + 14 + 14) = 42 (cm) (Length of side of square =) 42 ÷ 4 = 10.5 (cm)	 B1 M1 A1	 May be implied. F.T. 'their 42' provided ≠ 14
OCW	Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means.
	Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
5.	0.1(0) 10% $\frac{2}{25}$ 0.08	B4	B1 for each correct response.
6.(a)	32.16	B1	Accept $32\frac{4}{25}$ and $\frac{804}{25}$. B0 for 804 ÷ 25.
6.(b)	0.4	B1	Accept $\frac{2}{5}$. B0 for 2 ÷ 5 or $\frac{1.6}{4}$
7.(a)	trapezium	B1	
7.(b)	cuboid	B1	
7.(c)	a reflex angle	B1	
7.(d)	parallelogram	B1	
8.(a)	Point R plotted correctly	B1	
8.(b)	(-3, 2)	B1	
9.	275	B2	B1 for sight of 301.

10.(a) 1, 4 and 25	B3	Answer space takes precedence. Accept 1^2, 2^2 and 5^2. B2 for writing three numbers which add to 30, two of which are square (e.g. 16, 9, 5). B1 for writing three numbers: • at least two of which are square, OR • which add to 30, one of which is square, OR • which are all square. SC2 for an answer of 1, 2 and 5 with correct working. SC1 for an unsupported answer of 1, 2 and 5
10.(b) 1, 5, 7, 7 OR 3, 5, 7, 7	B3	Answer space takes precedence. B2 for writing four odd and positive numbers (not 7, 7, 7, 7) which fulfil one of the conditions: • the mode of the numbers is 7 • the median of the numbers is 6 OR for an answer which satisfies both conditions but includes an even number (e.g. 2, 5, 7, 7) B1 for writing four numbers which fulfil only one of the conditions: • the mode of the numbers is 7 • the median of the numbers is 6 OR for an answer of 7, 7, 7, 7.
11.(a) 0·125 × 1176 or equivalent. = 147 ISW	M1 A1	
11.(b) 4·7	B2	If further incorrect work shown e.g. '4·7 = 5' then allow B1 only. B1 for sight of 4·6 or 4·68(…..) or 4·70
12. f = 73(°) g = 128 – 73 = 55(°)	B1 M1 A1	F.T. 128 – 'their f'.
Alternative method f = 73(°) *g = 180 – (180 −128) – 73* *= 55(°)*	*B1* *M1* *A1*	*FT 'their f'.*
13. (1) **5** (9) (7) (8) **2** **9** (4) (1)	B3	B1 for each. No F.T.
14.(a) $\frac{1}{12}$	B1	
14.(b) D	B1	
14.(c) $\frac{1}{3}$	B1	
15. Sight of 6·25 (hrs) OR 375 (min) (Planning =) $\frac{2}{5}$ × 6·25 OR $\frac{2}{5}$ × 375 = 2·5 (hrs) OR 150 (min) (Remainder of work = 6·25 – 2·5 OR 375 – 150 =) 3·75 (hrs) OR 225 (min) = 3 hours 45 minutes	B1 M1 A1 B1 B1	F.T. 'their time' in hours or in minutes. May be seen in parts (1/5th and then 2/5ths) [Note: 2/5 × 6·15 OR 2/5 × 615 is B0M1(FT) = 2·46(hrs) OR 246(min) A1(FT) BUT A0 if 2·46 then used as 2h 46m] F.T. 'their derived times' using same units. F.T. correct conversion of 'their times', correct to the nearest minute (rounded or truncated), if of equivalent difficulty. Allow unambiguous indication of units.

10.(a) 1, 4 and 25	B3	Answer space takes precedence. Accept 1^2, 2^2 and 5^2. B2 for writing three numbers which add to 30, two of which are square (e.g. 16, 9, 5). B1 for writing three numbers: • at least two of which are square, OR • which add to 30, one of which is square, OR • which are all square. SC2 for an answer of 1, 2 and 5 with correct working. SC1 for an unsupported answer of 1, 2 and 5
10.(b) 1, 5, 7, 7 OR 3, 5, 7, 7	B3	Answer space takes precedence. B2 for writing four odd and positive numbers (not 7, 7, 7, 7) which fulfil one of the conditions: • the mode of the numbers is 7 • the median of the numbers is 6 OR for an answer which satisfies both conditions but includes an even number (e.g. 2, 5, 7, 7) B1 for writing four numbers which fulfil only one of the conditions: • the mode of the numbers is 7 • the median of the numbers is 6 OR for an answer of 7, 7, 7, 7.
11.(a) $0{\cdot}125 \times 1176$ or equivalent. $= 147$ ISW	M1 A1	
11.(b) $4{\cdot}7$	B2	If further incorrect work shown e.g. '$4{\cdot}7 = 5$' then allow B1 only. B1 for sight of $4{\cdot}6$ or $4{\cdot}68(\ldots..)$ or $4{\cdot}70$
12. $f = 73(°)$ $g = 128 - 73$ $= 55(°)$	B1 M1 A1	F.T. 128 − 'their f'.
Alternative method $f = 73(°)$ $g = 180 - (180 - 128) - 73$ $= 55(°)$	*B1* *M1* *A1*	*FT 'their f'.*
13. (1) **5** (9) (7) (8) **2** **9** (4) (1)	B3	B1 for each. No F.T.
14.(a) $\frac{1}{12}$	B1	
14.(b) D	B1	
14.(c) $\frac{1}{3}$	B1	
15. Sight of 6·25 (hrs) OR 375 (min) (Planning =) $\frac{2}{5} \times 6{\cdot}25$ OR $\frac{2}{5} \times 375$ $= 2{\cdot}5$ (hrs) OR 150 (min) (Remainder of work = $6{\cdot}25 - 2{\cdot}5$ OR $375 - 150$ =) 3·75 (hrs) OR 225 (min) = 3 hours 45 minutes	B1 M1 A1 B1 B1	F.T. 'their time' in hours or in minutes. May be seen in parts ($1/5^{th}$ and then 2/5ths) [Note: $2/5 \times 6{\cdot}15$ OR $2/5 \times 615$ is B0M1(FT) $= 2{\cdot}46$(hrs) OR 246(min) A1(FT) BUT A0 if 2·46 then used as 2h 46m] F.T. 'their derived times' using same units. F.T. correct conversion of 'their times', correct to the nearest minute (rounded or truncated), if of equivalent difficulty. Allow unambiguous indication of units.

20.(a)		40·5 (mm)	B1	
20.(b)	(25·5 + 25·5 =)	51 (mm)	B1	
20.(c)	(11·5 + 11·5=)	23 (mm)	B1	

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

	GCSE MATHEMATICS **Unit 2: Foundation Tier**	**Mark**	**Comments**
1.	1.98 53 5.88 0.41	B1 B1 B1 B1	Ignore spurious units
2.(a)	3 700 000	B1	
2.(b)	9998	B1	
2.(c)	1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5. B1 for 2 correct factors with none incorrect, OR for 3 or 4 correct with no more than one incorrect.
3.(a)	unlikely	B1	
3.(b)	20	B1	
3.(c)	Rolling a 1 on the dice	B1	
4.(a)		B2	B1 for two correct lines with one incorrect line OR for one correct line with no incorrect lines.
4.(b)	(an) equilateral (triangle)	B1	
5.(a)	102 OR 120	B1	
5.(b)	201 OR 210	B1	
6.	Three different even numbers with a sum of 24, not including 8. Possible solutions are 2, 4 (and) 18 2, 6 (and) 16 2, 10 (and) 12 4, 6 (and) 14	B3	In any order. Allow inclusion of negative numbers. If B3 not awarded, award B2 for three numbers which sum to 24 which satisfy two of the three conditions: • The numbers are different • The numbers are even • None of the numbers is 8 If B2 not awarded, award B1 for three numbers which sum to 24.
7.(a)	0.12 or $\frac{3}{25}$. or equivalent	B1	
7.(b)	$\frac{3}{5} \times 632$ or equivalent = 379.2	M1 A1	Award M1 A0 for 1896/5 or $379\frac{1}{5}$.
7.(c)	2.5	B1	
8.	$\frac{3}{10}$ 30 $\frac{9}{(20)}$ 0.45	B1 B1 B1 B1	Accept 30/100 for 3/10

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1: Foundation Tier	Mark	Comments
1. (a) Angle of 35° drawn at A	B1	Accept 33° to 37° Point alone is not sufficient.
1.(b) Circle radius 7cm (diameter 14 cm)	B1	Accept radius 6.8 (cm) to 7.2 (cm)
2.(a) 5433	B1	
2.(b) 174	B1	
2.(c) 75	B1	
2.(d) 6 × 7 ÷ 2 = 21	M1 A1	If no marks, award SC1 for sight of 42.
3.(a) 600	B1	
3.(b) 4000	B1	
4.(a) D	B1	
4.(b) S	B1	
5.(a) 9	B1	
5.(b) ÷ –	B1	
6.(a) 53	B1	
6.(b) 125	B1	
7.(a) 70 (%)	B1	
7.(b) 6 sectors shaded	B1	
8. 1/3 × 180(°) OR 2/3 × 180(°) or equivalent 60(°) OR 120(°) (180 – 60 =) 120 (°) OR (180 – 120 =) 60 (°)	M1 A1 B1	 A1 for either 60(°) OR 120(°) FT 'their 60' or 'their 120'. Two angles which add to 180(°) will get this B1. If no marks award SC1 for one angle twice the size of the other.
Alternative Method *2x + x = 180 (°) or 3x = 180 (°)* *x = 60 (°)* *2x = 120 (°)*	 M1 A1 B1	 *FT 2 × 'their x' or 180 – 'their x'*
9.(a) 16g	B1	
9.(b) (y =) 9	B1	Accept embedded answers. Mark final answer.
9.(c) (w =) 30	B1	Accept embedded answers. Mark final answer.

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

GCSE Mathematics Unit 1 Intermediate Tier		Mark	Comments
1.(a)	20(:)18 OR 8(:)18 p.m.	B1	B0 for (0)8:18 or 8:18 a.m or 20:18 a.m. Allow 20(:)18 p.m. and 08:18 p.m.
1.(b)	6 (hours) 40 (minutes)	B1	
1.(c)	265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
2.(a)	Line x = −4 drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
2.(b)(i)	Point C shown at (−2,−4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line') Otherwise, B1 if Point C at (−2,y) y≠3. (BÂC = 90°) SC1 for point C at (5,−4).
2.(b)(ii)	(−2,−4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
3.(a)(i)	2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
3.(a)(ii)	0·08	B1	Mark final answer
3.(a)(iii)	Correctly using a common denominator. 13 or equivalent. 18	M1 A1	Mark final answer.
3.(b)	0·05	B1	
4.	<table><tr><td>Answer</td><td>Yes</td><td>No</td><td>Not sure</td></tr><tr><td>Number of students</td><td>150</td><td>50</td><td>100</td></tr></table>	 B3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) ⅓(300 − 'Yes') AND (Not sure =) ⅔(300 − 'Yes') If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) ⅓(300 − 'Yes') OR (Not sure =) ⅔(300 − 'Yes') or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for 'Yes' + 'No' + 'Not sure' = 300.
5.(a)	4x = 10 − 7 (=3) x = 3/4 or equivalent.	B1 B1	 FT from 4x = b. Integer answer required if b is a multiple of 4 Mark final answer. Allow an embedded answer eg 4 × 0·75 + 7 = 10 for B2, but penalise −1 if contradicted by x ≠ 0·75
5.(b)	5d − 2e	B2	Must be an expression for B2. B1 for sight of (+)5d OR sight of − 2e. B1 for 5d + − 2e. Mark final answer.
6.	a = 113 b = 67 c = 113	B1 B1 B1	C.A.O. OR FT 180 − 'their a'. OR FT = 'their a' OR FT 180 − 'their b'.
7.	AB = 13 (cm) (Area =) 13 × 13 = 169 (cm²)	B1 M1 A1	For any indication that side of square = 13 (cm). May be seen on the diagram. No FT (but note SC1). C.A.O. Unsupported 169 (cm²) gains all 3 marks. If no marks gained award SC1 for a final answer of144 (cm²)

WJEC GCSE MATHEMATICS

AUTUMN 2020 MARK SCHEME

	GCSE MATHEMATICS **Unit 2: Foundation Tier**	**Mark**	**Comments**
1.	1.98 53 5.88 0.41	B1 B1 B1 B1	Ignore spurious units
2.(a)	3 700 000	B1	
2.(b)	9998	B1	
2.(c)	1, 3, 5 and 15	B2	Ignore repeats. Allow 1×15 and 3×5. B1 for 2 correct factors with none incorrect, OR for 3 or 4 correct with no more than one incorrect.
3.(a)	unlikely	B1	
3.(b)	20	B1	
3.(c)	Rolling a 1 on the dice	B1	
4.(a)		B2	B1 for two correct lines with one incorrect line OR for one correct line with no incorrect lines.
4.(b)	(an) equilateral (triangle)	B1	
5.(a)	102 OR 120	B1	
5.(b)	201 OR 210	B1	
6.	Three different even numbers with a sum of 24, not including 8. Possible solutions are 2, 4 (and) 18 2, 6 (and) 16 2, 10 (and) 12 4, 6 (and) 14	B3	In any order. Allow inclusion of negative numbers. If B3 not awarded, award B2 for three numbers which sum to 24 which satisfy two of the three conditions: • The numbers are different • The numbers are even • None of the numbers is 8 If B2 not awarded, award B1 for three numbers which sum to 24.
7.(a)	0.12 or $\frac{3}{25}$. or equivalent	B1	
7.(b)	$\frac{3}{5} \times 632$ or equivalent = 379.2	M1 A1	Award M1 A0 for 1896/5 or $379\frac{1}{5}$.
7.(c)	2.5	B1	
8.	$\frac{3}{10}$ 30 $\frac{9}{(20)}$ 0.45	B1 B1 B1 B1	Accept 30/100 for 3/10

8. (Probability of Puffin Island=) 1 − 0·4 − 0·15 − 0·25 = 0·2	M1 A1	An unsupported answer of 0·56 implies M1
(Number of cards showing Puffin Island =) 0·2 × 80	M1	FT 'their stated P(Puffin Island)' × 80, only if 'their stated P(Puffin Island)' < 1.
= 16	A1	16/80 is M1A0 unless 16 has been seen.
Alternative method *(Number of cards showing other 3 islands =)* *0·4 × 80 + 0·15 × 80 + 0·25 × 80 or equivalent* *= 64*	*M1* *A1*	*Allow M1 for sight of 32 AND 12 AND 20.*
(Number of cards showing Puffin Island =) 80 – 64	*M1*	*FT 80 − 'their derived 64', only if 'their derived 64' < 80.*
= 16	*A1*	*16/80 is M1A0 unless 16 has been seen.*
8. OCW Organisation and Communication.	OC1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means
Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
9.(a) Correct construction method. e.g. (i) intersecting arcs of radii 6cm and 9cm with centres A and C respectively. OR (ii) copying the angle at B at the point A (will require AB or BA to be extended).	M1	Relevant construction arcs must be seen.
Completed parallelogram.	A1	
9.(b) 'measured length' × 200	M1	Allow for error in measuring line XY.
= 1520 (cm)	A1	Accept only in range 1480 to 1560 inclusive.
= 15·2 metres	B1	FT 'their 1520' ÷ 100. Unsupported 14·8 to 15·6 inclusive gains all 3 marks.
Alternative method *Sight of scale is 1cm represents 2m*	*B1*	
'measured length' × 2	*M1*	*Allow for error in measuring line XY.*
= 15·2 metres	*A1*	*Accept only in range 14.8 to 15.6 inclusive.*
10.(a) 9·231	B1	
10.(b) 170	B1	
10.(c) 10	B1	
11(a) 5n − 3	B2	B1 for sight of 5n. Mark final answer.
11.(b) 17	B1	
11.(c) 2n + 2 OR 2(n + 1)	B2	If 2n + 2 is not their final answer allow B1 for sight of 2n + 2 in earlier work. B1 for a correct answer not simplified or incorrectly simplified e.g. n + n + 2.

9. (Length of sides of Ivy's Cuboid B =) 3cm, 12cm, 20cm (Volume of Ivy's Cuboid =) 3 x 12 x 20 = 720 (cm^3)	B1 M1 A1	May be implied in further working. F.T. provided two of the dimensions are correct.
Alternative method *(Volume of Gareth's cuboid = 3 x 2 x 4 =) 24 (cm^3)* *(Volume of Ivy's cuboid =) 24 x 6 x 5* *= 720 (cm^3)*	*B1* *M1* *A1*	*F.T. for their stated volume for 'Gareth's cuboid'*
9. OCW Organisation and Communication Accuracy of writing	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means. For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc.
10.(a)(i) 16	B1	
10.(a)(ii) 2160	B2	B1 for sight of 2155(·.....) OR 2150 OR 2156. Mark final answer.
10.(b) 0·62 × 7·8 or equivalent. = 4·836 ISW	M1 A1	Unsupported 4·8.... implies M1. Accept $4\frac{209}{250}$ (ISW). Allow 1209/250 (ISW)
10.(c)(i) 247	B1	
10.(c)(ii) 2197	B1	
11.(a) 6 −5	B2	B1 for 6. B1 FT for correct evaluation of 'their 6' − 11 **only** if it leads to a negative answer.
11.(b) 15	B2	B1 for sight of 28·8 OR −13·8. Mark final answer.
12. $\frac{400}{17·5}$ or $\frac{4}{0·175}$. = 22·8(....) or 22·9 (Number of rods =) 22	M2 A1 B1	M1 if incorrect place value (in either length). Digits 228..... implies M1. C.A.O. FT if of equivalent difficulty. (i.e. 'their 22·8' must be greater than 1 AND their 1st decimal place number greater than or equal to 5.) Answer of 22 gains all 4 marks. Unsupported answer of 23 gains M2A0B0.
12. Alternative method (trial and improvement) *Working with a multiple of 17·5 or 0·175.* *(n × 17·5 or n × 0·175)* *22 × 17·5 (= 385) or 22 × 0·175 (= 3·85)* *23 × 17·5 (= 402·5) or 23 × 0·175 (= 4·025)* *(Number of rods =) 22*	*S1* *B1* *B1* *B1*	*Award this S1 only if* *n > 2 and n ≠ 4 and n ≠ 400.* *This implies previous S1.* *This implies previous S1 and previous B1 if 402·5 seen.* *Must be seen in answer space or unambiguously identified (not simply embedded).* *Answer of 22 gains all 4 marks.* *Unsupported answer of 23 gains S1B0B1B0.*

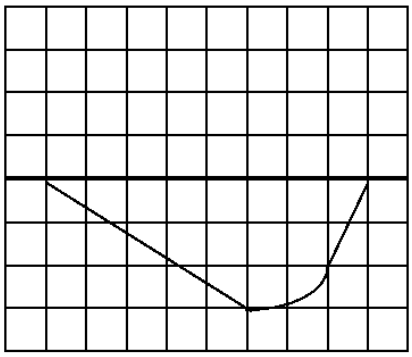
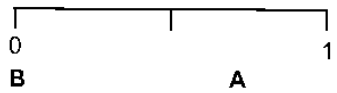
13.(b)	6 (hours) 40 (minutes)	B1	
13.(c)	265 (seconds)	B2	B1 for sight of 435 AND 170 OR B1 for sight of 300 AND 35 OR B1 for 4 minutes 25 seconds.
14.(a)	Line x = −4 drawn	B1	Line must be at least 2 units long. B0 if 'extra' lines drawn unless correct line unambiguously identified.
14.(b)(i)	Point C shown at (−2,−4)	B2	Allow B2 if point C not labelled but is unambiguously at the correct position (eg 'end of line'). Otherwise, B1 if Point C at (−2,y) y≠3. (BÂC = 90°) SC1 for point C at (5,−4).
14.(b)(ii)	(−2,−4)	B1	FT 'their unambiguously identified position of point C'. Allow missing brackets.
15.(a)	2700	B2	B1 for sight of 27 OR sight of 100. Mark final answer.
15.(b)	0·08	B1	Mark final answer
15.(c)	Correctly using a common denominator. 13 or equivalent. 18	M1 A1	Mark final answer.
16.	<table><tr><td>Answer</td><td>Yes</td><td>No</td><td>Not sure</td></tr><tr><td>Number of students</td><td>150</td><td>50</td><td>100</td></tr></table>	B3	B1 for (Yes =) 150 C.A.O. B2 for (No =) 50 AND (Not sure =) 100. or FT 'their Yes' for (No =) ⅓(300 − 'Yes') AND (Not sure =) ⅔(300 − 'Yes') If B2 not gained, then B1 for (No =) 50 OR (Not sure =) 100 or FT 'their Yes' for (No =) ⅓(300 − 'Yes') OR (Not sure =) ⅔(300 − 'Yes') or B1 for 'No' + 'Not sure' = 150 or B1 if 'Not sure' = 2 × 'No'. or B1 for Yes + No + Not sure = 300.
17.	a = 113 b = 67 c = 113	B1 B1 B1	C.A.O. OR FT 180 − 'their a'. OR FT = 'their a' OR FT 180 − 'their b'.
18.(Probability of Puffin Island=)1 − 0·4 − 0·15 − 0·25 = 0·2 (Number of cards showing Puffin Island =) 0·2 × 80 = 16		M1 A1 M1 A1	An unsupported answer of 0·56 implies M1 FT 'their stated P(Puffin Island)' × 80, only if 'their stated P(Puffin Island)' < 1. 16/80 is M1A0 unless 16 has been seen.
Alternative method *(Number of cards showing other 3 islands =)* *0·4 × 80 + 0·15 × 80 + 0·25 × 80 or equivalent* *= 64* *(Number of cards showing Puffin Island =) 80 − 64* *= 16*		*M1* *A1* *M1* *A1*	*Allow M1 for sight of 32 AND 12 AND 20.* *FT 80 − 'their derived 64', only if 'their derived 64'<80.* *16/80 is M1A0 unless 16 has been seen.*

19.(a) Correct <u>construction</u> method. e.g. (i) intersecting arcs of radii 6cm and 9cm with centres A and C respectively. OR (ii) copying the angle at B at the point A (will require AB or BA to be extended). Completed parallelogram.	M1 A1	Relevant construction arcs must be seen.
19.(b) 'measured length' × 200 = 1520 (cm) = 15·2 metres	M1 A1 B1	Allow for error in measuring line XY. Accept only in range 1480 to 1560 inclusive. FT 'their 1520' ÷ 100. Unsupported 14·8 to 15·6 inclusive gains all 3 marks.
<u>Alternative method</u> *Sight of scale is 1cm represents 2m* *'measured length' × 2* *= 15·2 metres*	*B1* *M1* *A1*	*Allow for error in measuring line XY.* *Accept only in range 14.8 to 15.6 inclusive.*
20.(a) 9·231	B1	
20.(b) 170	B1	
20.(c) 10	B1	

16. $2{\cdot}656 \times 10^6$	B2	B1 for a correct value but not in standard form. Mark final answer. B1 for sight of 2 656 000. SC1 for $2{\cdot}66 \times 10^6$ or $2{\cdot}7 \times 10^6$ or $2{\cdot}6 \times 10^6$ or $2{\cdot}65 \times 10^6$
17. Sight of 24·5 AND 15·5 OR Sight of 23·5 AND 14·5	B1	Sight of (Greatest =) 80 OR (Least =) 76 implies B1
2(24·5 + 15·5) – 2(23·5 + 14·5) or equivalent	M1	FT only for upper bounds of 24·4 AND 15·4 or 24·49 AND 15·49 (lower bounds must be 23·5 AND 14·5 else M0)
= 4(cm)	A1	CAO If M0, award B1 and an SC1 for sight of (Greatest =) 80 AND (Least =) 76
Alternative method. *Difference between least and greatest length for each side = 1(cm)*	*B1*	
4 × 1	*M1*	*FT only for differences of 0·9 or 0·99*
= 4(cm)	*A1*	*CAO*
18. Method to eliminate variable e.g. equal coefficients with appropriate addition or subtraction. First variable found, x = 4 or y = −1. Substitute to find the 2nd variable. Second variable found	 M1 A1 m1 A1	*No marks for trial and improvement.* Allow 1 error in one term, not the term with equal coefficients. C.A.O. F.T. their '1st variable'. Award no marks for unsupported correct answers.
19.(a)(i) Correct reason given. e.g. 'An angle at the circumference subtended by a diameter is a right angle'. ' line AC is a diameter'	E1	Accept any correct unambiguous wording. The key word is 'diameter'. Allow eg 'angle in a semicircle is 90°', 'line AC goes through the centre'. 'opposite a diameter' Do not accept 'because it's a right angle'.
19.(a)(ii) $\tan x = \frac{7{\cdot}5}{4{\cdot}7}$	M1	
$x = \tan^{-1}(7{\cdot}5 / 4{\cdot}7)$ or $\tan^{-1} 1.6$ or $\tan^{-1} 1.59(\ldots)$	m1	Implies M1.
= 57·9(…)(°) or 57·8(…)(°) or 58(°)	A1	C.A.O. *Alternative method to find x* *A correct and complete method (using Pythagoras's theorem and a trigonometric relationship).* *M2* *x = 57·9(…)(°) or 57·8(…)(°) or 58(°) CAO* *A1*
19.(b) (y =) 58(°)	B1	Strict FT of 'their x'.
Correct circle theorem given. e.g. 'angles (at the circumference) subtended by the same chord (or arc) are equal', 'angles in the same segment (are equal)'.	E1	Accept any correct unambiguous wording. Allow eg 'angles on the same chord (are equal)' Do not accept e.g. 'they are equal' on its own.

WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

Unit 1: Foundation Tier	Mark	Comments
1.(a) Ninety-five thousand and forty-eight	B1	
1.(b) 931	B1	
1.(c) 1250	B1	
1.(d) 208	B1	
1.(e) 1,2,3,6,9,18	B2	B1 for 4 or 5 correct and 0 incorrect B1 for 5 or 6 correct and 1 incorrect Ignore repeated numbers Accept products 1×18, 2×9, 3×6
2.(a) 94 (mm)	B1	Accept 92 to 96 (mm)
2.(b) 136(°)	B1	Accept 134 to 138 (°)
3.(a) 16	B1	
3.(b) ¾	B1	Mark final answer.
3.(c) 28	B1	
4. 	B2	B1 for correct longer straight line. B1 for correct curve AND shorter straight line. The lines must pass through the correct points.
5.(a) 4.3 x 1000 4300 (g)	M1 A1	
5.(b) 3 × 100 ÷ 6 50 (cm)	M1 A1	If M0 A0, award SC1 for sight of 300(cm) or 0.5(m).
6. 	B1 B1	A should be between 0.6 and 0.8 B should be at 0

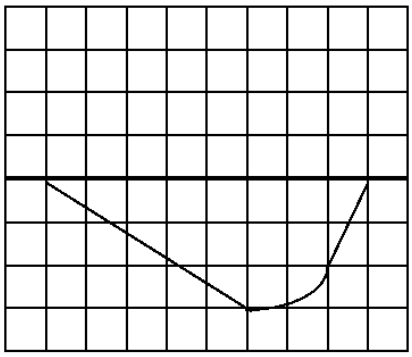
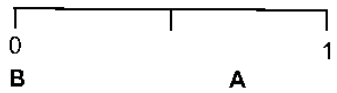
WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
1.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
2.(a) $\frac{1}{9}$	B1	
2.(b) 0·016	B1	
2.(c) 0·015	B1	
3.(a) 1/10 or 0·1	B1	Mark final answer.
3.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
4.(a) (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.
4.(b) Sight of 5 × 3 (=15) AND 5 × 2 (=10) AND 3 × 2 (=6) (Total Surface Area =) (5×3 + 5×2 + 3×2) × 2 62 (cm^2)	B1 M1 A1	For addition of all six surface areas. (Must be three different pairs.) FT 'their 15', 'their 10' and 'their 6' C.A.O.
5. Sight of 9 AND 49 n + 9 = 49 (n =) 40	B1 M1 A1	Any unambiguous indication that this linear relationship is being considered (including 'trial and improvement'). FT their $\sqrt{81}$ (≠81) AND their 7^2 (≠7) for M1 and possibly A1 if at least one correct value used. FT for M1 only if neither correct value used. Award M1 if 49 – 9 seen. Mark final answer.
6. Indicates 2 (letters out of 6 gain points) (Expected number of wins =) $\frac{2}{6}$ × 24 or equivalent = 8 (Points gained =) 8 × 10 = 80 (points) AND 'No' (Leah is not expected score 100 points)	B1 M1 A1 M1 A1 	Any unambiguous indication. FT 'their stated number of '10 point' letters'. Award M1A1 for 8/24 suggesting '8 wins out of 24' FT 'their derived 8' × 10 only if 'their derived 8' < 24. FT their derived number of points
Alternative method 1 *Indicates 2 (letters out of 6 gain points)* *(Each letter expected to be drawn) 24 (times)* *6* *= 4 (times)* *(Points gained =) 4 × 2 × 10* *= 80 (points) AND* *'No' (Leah is not expected score 100 points)*	 *B1* *M1* *A1* *M1* *A1* 	 *Any unambiguous indication.* *FT 'their derived 4' and 'their stated 2'.* *FT their derived number of points.*

WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

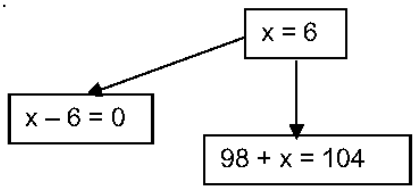
Unit 1: Foundation Tier	Mark	Comments
1.(a) Ninety-five thousand and forty-eight	B1	
1.(b) 931	B1	
1.(c) 1250	B1	
1.(d) 208	B1	
1.(e) 1,2,3,6,9,18	B2	B1 for 4 or 5 correct and 0 incorrect B1 for 5 or 6 correct and 1 incorrect Ignore repeated numbers Accept products 1×18, 2×9, 3×6
2.(a) 94 (mm)	B1	Accept 92 to 96 (mm)
2.(b) 136(°)	B1	Accept 134 to 138 (°)
3.(a) 16	B1	
3.(b) ¾	B1	Mark final answer.
3.(c) 28	B1	
4. 	B2	B1 for correct longer straight line. B1 for correct curve AND shorter straight line. The lines must pass through the correct points.
5.(a) 4.3 x 1000 4300 (g)	M1 A1	
5.(b) 3 × 100 ÷ 6 50 (cm)	M1 A1	If M0 A0, award SC1 for sight of 300(cm) or 0.5(m).
6. 	B1 B1	A should be between 0.6 and 0.8 B should be at 0

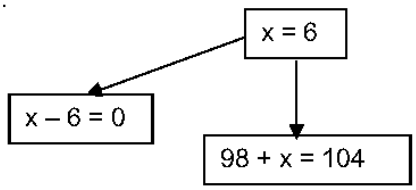
WJEC GCSE MATHEMATICS

AUTUMN 2021 MARK SCHEME

Unit 1: Intermediate Tier	Mark	Comments
1.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
1.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
2.(a) $\frac{1}{9}$	B1	
2.(b) 0·016	B1	
2.(c) 0·015	B1	
3.(a) 1/10 or 0·1	B1	Mark final answer.
3.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
4.(a) (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.
4.(b) Sight of 5 × 3 (=15) AND 5 × 2 (=10) AND 3 × 2 (=6) (Total Surface Area =) (5×3 + 5×2 + 3×2) × 2 62 (cm^2)	B1 M1 A1	For addition of all six surface areas. (Must be three different pairs.) FT 'their 15', 'their 10' and 'their 6' C.A.O.
5. Sight of 9 AND 49 n + 9 = 49 (n =) 40	B1 M1 A1	Any unambiguous indication that this linear relationship is being considered (including 'trial and improvement'). FT their $\sqrt{81}$ (≠81) AND their 7^2 (≠7) for M1 and possibly A1 if at least one correct value used. FT for M1 only if neither correct value used. Award M1 if 49 – 9 seen. Mark final answer.
6. Indicates 2 (letters out of 6 gain points) (Expected number of wins =) $\frac{2}{6}$ × 24 or equivalent = 8 (Points gained =) 8 × 10 = 80 (points) AND 'No' (Leah is not expected score 100 points)	B1 M1 A1 M1 A1	Any unambiguous indication. FT 'their stated number of '10 point' letters'. Award M1A1 for 8/24 suggesting '8 wins out of 24' FT 'their derived 8' × 10 only if 'their derived 8' < 24. FT their derived number of points
Alternative method 1 *Indicates 2 (letters out of 6 gain points)* *(Each letter expected to be drawn) 24 (times)* *6* *= 4 (times)* *(Points gained =) 4 × 2 × 10* *= 80 (points) AND* *'No' (Leah is not expected score 100 points)*	*B1* *M1* *A1* *M1* *A1*	*Any unambiguous indication.* *FT 'their derived 4' and 'their stated 2'.* *FT their derived number of points.*

5.(a) (0)7:45 23 (March)	B2	B1 for each. B0 for (0)7:45 p.m.
5.(b) Sight of 5 miles ≡ 8 km or equivalent. Shows 15 miles to be 24 km AND a valid statement e.g. 'yes (it's nearly 25 km'), 'no (it's only 24 km').	B1 B1	Allow a more accurate conversion (5 miles ≡ 8 to 8·05 km). Do not accept 3 miles ≡ 5 km '15 miles is 24 km' with no statement is B1B0. Accept a one word decision of 'Yes' or 'No' as a statement.
Alternative method *Sight of 8 km ≡ 5 miles or equivalent.* *Shows 25 km to be 15·625 miles AND a valid statement e.g.* *'yes (it's just over 15 miles'), 'no (it's over 15 miles)'.*	*B1* *B1*	*Allow a more accurate conversion* *(8 km ≡ 4·97 to 5 miles).* *Do not accept 5 km ≡ 3 miles* *'25 km is 15·625 miles' with no statement is B1B0.* *Accept a one word decision of 'Yes' or 'No' as a statement.*
6. Correct strategy of √(Area ABCD – 32) (Area ABCD =) 81 (cm^2) (Area PQRS = 81 – 32 =) 49 (cm^2) (PQ = √49 =) 7 (cm)	S1 B1 B1 B1	FT 'their stated area of ABCD' – 32. FT √'their stated area of PQRS' but not √32 or √9 A final answer of 7(cm) gains all four marks. May be seen on the diagram. (FT answers must be rounded or truncated to 1dp or more)
7.(a) 1·442	B2	B1 for sight of 1·44(1……) or 1·44(2……)
7.(b) 191	B3	B2 for sight of 190(·5…..) or 190·6 B1 for sight of 280.
8. (P(Gold) =) 1 – 0·68 – 0·22 = 0·1 22 people choose silver AND 10 people choose gold (Profit =) 100 × (£)2 – 22 × (£)3 – 10 × (£)8 = (£)54	M1 A1 B1 M1 A1	 May be seen in the table. FT 100 × 'their 0·1'. The 10 implies previous M1A1. The 22 and 10 may be seen in further work. FT 'their stated number of winners (silver and gold)'.
Alternative method1 *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *22 people choose silver AND 10 people choose gold* *(Profit =) 68 × (£)2 – 22 × (£)1 – 10 × (£)6* *= (£)54*	*M1* *A1* *B1* *M1* *A1*	 *May be seen in the table.* *FT 100 × 'their 0·1'. The 10 implies previous M1A1.* *The 22 and 10 may be seen in further work.* *FT 'their stated number of winners (silver and gold)'.*
Alternative method 2. *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *(Profit per game =)(£)2 – 0·22 × (£)3 – 0·1 × (£)8* *= (£)0·54* *(Total profit = £0·54 × 100 =) (£)54*	*M1* *A1* *M1* *A1* *B1*	 *May be seen in the table.* *FT 'their 0·1.* *FT 'their derived £0·54'.*
Alternative method 3. *(P(Gold) =) 1 – 0·68 – 0·22* *= 0·1* *(Profit per game =)0·68×(£)2 – 0·22×(£)1 – 0·1×(£)6* *= (£)0·54* *(Total profit = £0·54 × 100 =) (£)54*	*M1* *A1* *M1* *A1* *B1*	 *May be seen in the table.* *FT 'their 0·1.* *FT 'their derived £0·54'.*
9.(a) −1·3 0·4 2·1	B2	B1 for two correct in the correct position. OR for −3, −1·3, 0·4.
9.(b) 10(th term)	B1	Allow B1 for 10(th) and 14. B0 if only 14 given in answer space. NOTE: If answer to 9(a) is −3, −1·3, 0·4 then allow an answer of 11(th term)

7. 	B2	B1 for 2 correct answers and 1 incorrect answer B1 for 1 correct answer and 1 incorrect answer B1 for 1 correct answer and 0 incorrect answer
8. **Use** of 360(°), e.g. 8x = 360(°) (x =) 360/8(°) (x =) 45(°)	B1 M1 A1	M1 implies B1 If B0 M0 A0, award SC1 for x = 22.5(°) from accurate working from 8x = 180(°)
9. (Perimeter of rectangle =) 15+15+7+7 = 44 (cm) (Length of side of square =) 44 ÷ 4 (cm) 11 (cm)	M1 A1 M1 A1	FT 'their stated 44', but not 15 or 7.
9. OCW Organisation and Communication Accuracy of Writing	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
10.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
10.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
11.(a) $\frac{1}{9}$	B1	
11.(b) 0·016	B1	
11.(c) 0·015	B1	
12.(a) $\frac{1}{10}$ or 0·1	B1	Mark final answer.
12.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
13. (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.

7. 	B2	B1 for 2 correct answers and 1 incorrect answer B1 for 1 correct answer and 1 incorrect answer B1 for 1 correct answer and 0 incorrect answer
8. **Use** of 360(°), e.g. 8x = 360(°) (x =) 360/8(°) (x =) 45(°)	B1 M1 A1	M1 implies B1 If B0 M0 A0, award SC1 for x = 22.5(°) from accurate working from 8x = 180(°)
9. (Perimeter of rectangle =) 15+15+7+7 = 44 (cm) (Length of side of square =) 44 ÷ 4 (cm) 11 (cm)	M1 A1 M1 A1	FT 'their stated 44', but not 15 or 7.
9. OCW Organisation and Communication Accuracy of Writing	OC1 W1	For OC1, candidates will be expected to: • present their response in a structured way • explain to the reader what they are doing at each step of their response • lay out their explanation and working in a way that is clear and logical • write a conclusion that draws together their results and explains what their answer means For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
10.(a) (x =) 180 – 90 – 37 or equivalent. = 53(°)	M1 A1	
10.(b) (a =) 51(°) (b =) 360 – (51 + 82 + 153) or equivalent. = 74(°)	B1 M1 A1	FT 'their 51', i.e. 125 – 'their 51' provided 'their 51' < 125.
11.(a) $\frac{1}{9}$	B1	
11.(b) 0·016	B1	
11.(c) 0·015	B1	
12.(a) $\frac{1}{10}$ or 0·1	B1	Mark final answer.
12.(b) Sight of 27 AND 4 (27 ÷ 4 =) 6·75	B1 B1	FT if at least 27 or 4 correct and of equivalent difficulty (i.e. not leading to a whole number answer). Answer must be a decimal
13. (Volume =) 5 × 3 × 2 = 30 (cm^3)	M1 A1	Any additional calculation e.g. 30 ÷ 2 = 15 is M0.

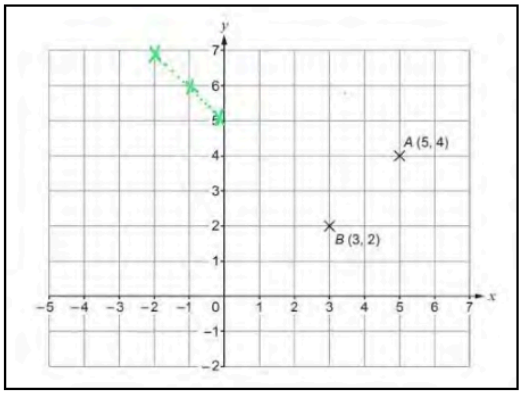
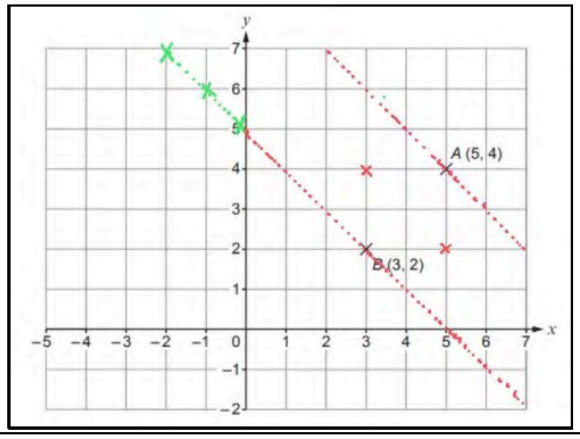
10. (-2, 1)	B2	B1 for: • one correct coordinate, or • a clear indication of the correct position of the midpoint, or • the correct coordinates reversed.
11.(a) 7x =14 x = 2	B1 B1	FT from 7x = k. Accept x = k/7 (but, if on FT k is a multiple of 7, final answer must be given as a whole number.) B1B0 for 'x = 14/7' An evaluated FT for k ÷ 7 must be rounded or truncated to at least 2dp. e.g. 7x = 8 (B0) followed by, x = 8 ÷ 7 (B0) x = 8/7 (B1), x = $1^{1}/_{7}$ (B1), x = 1·14 (B1), x = 1·1 (B0) Mark final answer. Allow 2 marks for embedded answer BUT only 1 mark if contradicted by x ≠ 2.
W Accuracy of writing.	W1	For W1, candidates will be expected to: • show all their working • make few, if any, errors in spelling, punctuation and grammar • use correct mathematical form in their working • use appropriate terminology, units, etc
11.(b) 10	B2	C.A.O. B1 for sight of 17·4 OR −7·4 Do not accept 17·4f nor −7·4g Do not treat the use of 3·7 for −3·7 as a misread.
12. (Total number of paper clips =) 200 × 440 × n where 320 ≤ n ≤ 330. Correct evaluation. (To the nearest ten million) 30 000 000 (paper clips)	M2 A1 B1	M1 for 200 × n OR 440 × n where 320 ≤ n ≤ 330. Allow use of 400 or 450 for 440. *Note* *If n taken to be 225 or 425 treat as a misread and allow M2 but penalise −1 from any further A1, B1 marks gained.* CAO from their numbers if M2 gained. (n=320 gives 28 160 000, n=325 gives 28 600 000, n=330 gives 29 040 000.) FT 'their evaluation' if greater than 5 million. A final answer of 30 million implies M2A1B1. Allow M2A0B0 for an unsupported final answer of 28 000 000 or 29 000 000.
13.(a) 3	B1	If no answer seen, check table.
13.(b) 15	B1	If no answer seen, check table.
14.(a) (0)7:45 23 (March)	B2	B1 for each. B0 for (0)7:45 p.m.
14.(b) Sight of 5 miles ≡ 8 km or equivalent. Shows 15 miles to be 24 km AND a valid statement e.g. 'yes (it's nearly 25 km'), 'no (it's only 24 km').	B1 B1	Allow a more accurate conversion (5 miles ≡ 8 to 8·05 km). Do not accept 3 miles ≡ 5 km '15 miles is 24 km' with no statement is B1B0. Accept a one word decision of 'Yes' or 'No' as a statement.
Alternative method *Sight of 8 km ≡ 5 miles or equivalent.* *Shows 25 km to be 15·625 miles AND a valid statement e.g. 'yes (it's just over 15 miles'), 'no (it's over 15 miles)'.*	*B1* *B1*	*Allow a more accurate conversion (8 km ≡ 4·97 to 5 miles).* *Do not accept 5 km ≡ 3 miles* *'25 km is 15·625 miles' with no statement is B1B0.* *Accept a one word decision of 'Yes' or 'No' as a statement.*

3. 2·73 (pints) ÷ 1·75 or 2·73 (pints) × 4/7 1·56 (litres)	M1 A1	**Answer lines take precedence** Allow use of 568ml or 570ml ≈ 1 pint leading to an answer of 1·55 or 1·56.
1·615(0) (litres)	B1	
1·25 + 1·56 + 1·615	M1	(= 4·425) FT 1·25 + 'their 1·56' + 'their 1·615'. Award M1 for 1·25 + 2·73 + 1615.
÷ 3	m1	
1·475 (litres) or 1·47 (litres) or 1·48 (litres)	A1	Allow 1·5 (litres) from correct working. Note: An answer of (1618.98/3 =) 539·66 or 540 or 539·6 or 539·7 implies M1m1A1.

4.(c) 39	B1	
5.(a) 16 and 25	B2	Answer space takes precedence. Accept 4^2 and 5^2. B1 for writing • two numbers with a difference of 9, one of which is square, or • two different square numbers in their answer space, or • listing at least three square numbers in their workings. If no marks, award SC1 for an unsupported answer of 4 and 5.
5.(b) No, AND correct reason stated e.g. • (two odd numbers) add to give an even number (and 37 is odd). • only an even and an odd number can add to make 37. • only an even and an odd number can add to make an odd number.	E1	E0 if incorrect box is ticked, even if the correct reason is given. If none of the boxes are ticked, 'no' may be implied by their reason. Accept equivalent reasons. Accept the use of 'make' or 'and' instead of 'add'. Allow 'there are no two odd numbers which add to make 37' or 'the answer will always be even'. Exemplifying two odd numbers adding to an even number by itself is insufficient.

(20) 9. 9.65 ISW	B1	Allow $\frac{193}{20}$ or $9\frac{13}{20}$ B0 for 193 ÷ 20

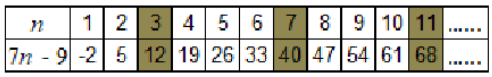
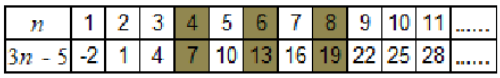
12. (a) 72	B2	B1 for an appropriate sight of 9 or 8.
12. (b) –31	B1	
12. (c) 42 ISW	B1	Allow 42·0

		• use appropriate terminology, units, etc
12. (a) (1, 0)	B2	Award B1 for one of the following: • if *C* clearly identified on grid but coordinates not given or are incorrect • for an answer of (4, 3) (midpoint of *AB*) • for an answer of $(1x, 0y)$ and point not identified.
12. (b) (-1, 6) OR (-2,7) 	B2	Award B2 for any point that satisfies the conditions e.g. (-1.5, 6.5) Award B1 for one of the following: • if *D* identified on grid in a correct position but coordinates not given or are incorrect OR • for the coordinates of any point that creates a right-angled triangle with AB as one side e.g. (0,5) (1,4) (2,3) (4,1) (5,0) (6,-1) (7,-2) (3,4) (5,2) (2,7) (3,6) (4,5) (6,3) (7,2) 

(Expected number of winners = 7/12 × 228) *133 (winners)*	*B1*	*If 7/12 or correct % or decimal seen in part (c), it must be used for this B1.* *FT 'their 7/12' if less than 1 × 228* *Allow 133/228 or '133 out of 228'* *Must be whole number* *Award B0 for* *7/12 × 228 = 0·58(333…) × 228 = 132 winners.* *Award B0 for* *7/12 × 228 = 0·6 × 228 = 136 or 137 winners.*
(Expected number that don't win = 228 – 133) *95 (non-winners)*	*B1*	*FT 228 – 'their 133' (provided < 228)*
(Amount taken = 95 × £2.50 =) *(£)237.5(0)*	*B1*	*FT £2.50 × 'their 95' provided < 133*
(Expected profit = 95 × £2.50 – 133 × £1 =) *(£)104.5(0)*	*B1*	*(£)237.5(0) – (£)133* *FT 'their (£)237.5(0)' – 'their (£)133'* *Award B1B1B1B0 for sight of* *95 × £2.50 – 133 × £1 with an incorrect final answer.* *If the FT results in a loss, the 'Loss' must be stated, or the answer left as a negative*

13. Showing 30% (31%), and 32% OR 30/100 , 31/100 and 32/100 OR (0·3), 0·31 and 0·32 OR three correct calculations for a common amount. 0·3 31%, 8/25 in order	B2 B1	B2 for all correct %, OR all correct fractions with a common denominator, OR all correct decimals, OR correct work using a common amount, OR a valid combination that allows full comparison. B1 for one correct conversion or two correct calculations for a common amount. Allow any unambiguous indication (e.g. 'converted' values.) **Strict FT** of 'their work' if at least B1 gained. Correct answer, with no other marks awarded, gains final B1 only.

14. (a) 0·4 shown on 'A does not occur' branch Use of 0·6 × ..... = 0·48 P(B occurs) = 0·8 Second set of branches 0·8, 0·2, 0·8, 0·2	B1 M1 A1 A1	 Allow M1A1 if 0·8 seen on one of the 'B occurs' branches. FT 'their 0·8' only if M1 awarded. (0·48, 0·52, 0·48, 0·52 is M0A0A0)
14. (b) 0·4 × 0·2 = 0·08 ISW	M1 A1	FT 'their 0·4' × 'their 0·2' provided both between 0 and 1.

15. (a) Any n, as a whole number, which results in $7n - 9$ being a multiple of 4	B2	Answer space takes precedence and must not be from incorrect working. Do not ignore crossed-out work for this question. Award B1 for any one of: • any 2 correctly evaluated terms in the sequence $7n - 9$ (i.e. not leading to, or not recognised as leading to, a multiple of 4 for their choice of n) or • setting up an equation $7n - 9 = 4 \times k$ (where $k \geq 1$ and a whole number) and attempt to solve • a correct value of n substituted in $7n - 9$, but contradiction or no answer given on answer line (e.g. 7×3 – 9 = 12 and 12 written on answer line or answer line left blank)  Note: Award B0 for a correct value of n from incorrect working e.g. if 7 × 4 – 9 = 19, then n = 19 on the answer line.
15. (b) Any n, as a whole number, which results in $3n - 5$ being a prime number	B2	Answer space takes precedence and must not be from incorrect working. Do not ignore crossed-out work for this question. Award B1 for any one of: • any 2 correctly evaluated terms in the sequence $3n - 5$ (i.e. not leading to, or not recognised as leading to, a prime number for their choice of n) or • setting up an equation $3n - 5$ = a prime number and attempt to solve • a correct value of n substituted in $3n - 5$, but contradiction or no answer given on answer line (e.g. 3×4 – 5 = 7 and 7 written on answer line or answer line left blank) • a correct value of n substituted in $3n - 5$, but n contradicted for their workings (but n still leads to a prime number) given on answer line (e.g. 3×4 – 5 = 7 and 12 written on answer line or answer line left blank).  Note: Award B0 for a correct value of n from incorrect working e.g. if 3 × 4 – 5 = 13, then n = 13 on the answer line.

n	1	2	3	4	5	6	7	8	9	10	11	.....
$7n - 9$	-2	5	12	19	26	33	40	47	54	61	68	.....

n	1	2	3	4	5	6	7	8	9	10	11	.....
$3n - 5$	-2	1	4	7	10	13	16	19	22	25	28	.....

16. Method to eliminate one variable e.g. 'equal coefficients AND appropriate intention to add or subtract' or use a method of substitution First variable found $x = 4$ or $y = 7$. Substitute to find the 2nd variable. Second variable found.	M1 A1 m1 A1	Allow one error in one term (not the term with equal coefficients). CAO. Award A0 for an answer that leads to a whole number, but not expressed as a whole number (e.g. $y = 161/23$ or $x = 92/23$) FT substitution of their '1st variable' if M1 gained. If FT leads to a whole number answer, it must be shown as a whole number. Otherwise accept a fraction. If no marks gained, allow SC1 for both answers of $x = 4$ AND $y = 7$.

17. (a)		$7{\cdot}2 \times 10^6$ cm^3	B1	
17. (b)	6		B1	

Unit 2: Foundation Tier		Mark	Comments
1.(a) 452 × 63 = 28 466		B1	
1.(b)	3838	B1	

2. –36·2	B2	Mark final answer. Award B1 for one of the following: • sight of –64·4 (not –64·4p) • sight of (+)28·2 (not 28·2q and not –28·2) • –36·2 (with additional letters).

2(a) one hundred and ninety-five thousand	B1	Do not accept • one hundred thousand and ninety-five thousand • 195 thousand
2(b) Caernarfon Castle	B1	Allow (+)0.2(%) as indication of Caernarfon Castle
2(c) 255949 + 260153 516 102	M1 A1	
2(d) 452 007 – 319 131 132 876	M1 A1	Allow 319 131 – 452 007 Allow -132 876

2(e) Yes and valid reason given e.g. 'Yes, because 455 428 is nearly 500 000' 'Yes, because if you round up 455 428 to the nearest hundred thousand it is 500 000' 'Yes, as 455 428 is closer to half a million than 400 000' 'Yes, because rounding to the nearest 100 000 would give you half a million'	E1	Allow e.g. 'Yes, because they had over 450 000' 'Yes, as only about 50 000 away from half a million' 'Yes, because 455 428 is nearly half a million' 'Yes, as you would round up to the nearest 50 000' 'Yes, as half a million is 500 000' 'No because it is nearly 45 000 short' 'No as it was only 455 428 so that's not quite half a million' 'No, because it is closer to 450 000' 'No because it is 460 000' 'No, because it is about 50 000 below' 'No, because it is just over 450 000' 'No, because the number is below 500 000 so it isn't half a million' 'No, because half a million is 500 000 but the number is 455 428' 'No because it would be in the 500 000 so he is wrong because 455 428 is less than half a million' Do not accept e.g. 'Yes, because 455 428 is about half a million' – this is the statement given 'No, because it's only 455 428' 'No because 455 428 isn't close to half a million as it is in the 4s' 'No, because they got 455 428'
2(f) Evidence of counting squares **inside** shape Answer in range 14 to 20 Correct evaluation of 'their area' × 4 and manager correct Or 48 ÷ 4 = 12 and manager correct	M1 A1 E1	 FT if M1 awarded for a correct evaluation of 'their area' × 4 and conclusion made consistent with their answer OR 'their area' is in the range 13 to 22 with 'their area' × 4 correct and manager correct
Alternative method *Evidence of splitting each square into 4* *Answer in range 56 to 80* *Correct evaluation (conclusion) of the area with manager correct*	*M1* *A1* *E1*	*Or for counting up in 4s up to at least 20* *Must not come from incorrect work* *FT if M1 awarded with conclusion made consistent for 'their area'* *OR* *'their area' is in the range 52 to 88 with correct conclusion*

<table>
<tr>
<td>3(a) Compare small with large using same <u>volume</u>, e.g.
• Volume of 4 small cartons
• Cost of 4 small cartons
• Cost of 500ml of large carton
OR
Compare medium with large using <u>volume and cost</u>, e.g.
• Cost for 2400ml medium cartons
• Cost of 1000ml large carton</td>
<td>B1</td>
<td>Accept for ‘their 4’ from 2000 ÷ 500
Ignore incorrect units given
<table><tr><td>4 small</td><td>vol</td><td>4 × 500</td><td>2000ml</td></tr><tr><td>4 small</td><td>cost</td><td>4 × (0.)40</td><td>£1.6(0) or 160p</td></tr><tr><td>500ml large</td><td>cost</td><td>2(.)50 ÷ 4</td><td>£0.625 or 62.5p</td></tr><tr><td>2400ml medium</td><td>cost</td><td>2 × 1(.)20</td><td>£2.40 or 240p</td></tr><tr><td>1000ml large</td><td>cost</td><td>2(.)50 ÷ 2</td><td>£1.25 or 125p</td></tr></table></td>
</tr>
<tr>
<td>Compare the small with the medium using <u>cost</u>, e.g.
• Volume for £1.20 in small cartons
• Cost of 3 small cartons
• Volume of 1/3 of a medium carton
• Cost of 400 ml medium carton</td>
<td>B1</td>
<td>Accept for ‘their 3’ from 1200 ÷ 400
Ignore incorrect units given
<table><tr><td>£1.20 in small</td><td>vol</td><td>3 × 500</td><td>1500 ml</td></tr><tr><td>3 small</td><td>cost</td><td>3 × (0.)40</td><td>£1.20 or 120p</td></tr><tr><td>1/3 medium</td><td>vol</td><td>1200 ÷ 3</td><td>400 ml</td></tr><tr><td>400 ml medium</td><td>cost</td><td>1(.)20 ÷ 3</td><td>£0.4(0) or 40p</td></tr></table></td>
</tr>
<tr>
<td>Conclusion ‘small’ based on accurate calculations from full comparison</td>
<td>B1</td>
<td>Only FT from B1, B1
Must have consistent correct units or allow no units given</td>
</tr>
<tr>
<td><u>3(a) Alternative method 1</u>
Method of comparing all 3 cartons, e.g.
ml per 10p or p per 100ml or £ per 6000 ml</td>
<td>M2</td>
<td>Ignore incorrect units given
M1 for attempt to compare at least 2 of the 3 cartons
<table><tr><td></td><td>Small</td><td>Medium</td><td>Large</td></tr><tr><td>ml for 10p</td><td>500 ÷ 4 = 125</td><td>1200 ÷ 12 = 100</td><td>2000 ÷ 25 = 80</td></tr><tr><td>p per 100 ml</td><td>40 ÷ 5 = 8</td><td>1(.)20 ÷ 12 = 10</td><td>2(.)50 ÷ 20 = 12.5
Allow 12 or 13</td></tr><tr><td>£ per 6000ml</td><td>12 × 0(.)40 = 4.80</td><td>5 × 1(.)20 = 6</td><td>3 × 2(.)50 = 7.50</td></tr></table></td>
</tr>
<tr>
<td>Conclusion ‘small’ based on accurate calculations from full comparison</td>
<td>A1</td>
<td>Only FT from M2
Must have consistent correct units or allow no units given
From division calculations, allow rounding and truncation provided it does not impact on being able to compare</td>
</tr>
<tr>
<td>3(b) 300 × 30 ÷ 12 or 300 × 2.5 or 30 × 25 or 2 × 300 + ¼ (2 × 300) or 600 + 150 or equivalent

750(ml)</td>
<td>M1

A1</td>
<td>May be seen in stages

CAO</td>
</tr>
</table>

4(a) 7	B1	
4(b) 9	B1	
4(c) No and valid reason given e.g. 'No because you add two onto each of the design numbers' 'No because it is the design + 2' 'No because that rule doesn't work for Design 2' 'No because Design 2 uses 4 pieces (not 6)' 'No, because for design 2, 2 × 3 = 6, design 3, 3×3 = 9 and both totals are not correct' 'No, because design 3 has 5 pieces of metal which shows it is not multiplied by 3' 'No because design 3 would be 9 and not 5' 'No because the rule is n + 2 not n × 3'	E1	Ignore any further spurious comments. Do not accept 'No, because the designs add one more piece of metal each time' 'No because you add on 1 each time' Do not accept values from incorrect number work e.g. 'No because design 3 would be 6 and not 5'
4(d) 180 – (55 + 90) or 90 - 55 35(°)	M1 A1	
4(e) (30 – 14) ÷ 2 (£)8	M1 A1	May be seen in stages Allow sight of embedded 8 for M1, e.g. • 2 × 8 + 14 = 30 • 2 × 8 = 16 + 14 = 30 Award M1 for sight of two correctly evaluated improving trials e.g. 2 × 6 + 14 = 26 AND 2 × 7 + 14 = 28 Answer line takes precedence – do not award A1 if answer line states £30 If answer line is blank, accept embedded answers provided that it is not contradicted *(e.g. if they say cost of materials is 30)*

6(a) Reasonable explanation, e.g. 'no one spent longer than 80 minutes training' '1 hour 25 minutes is more than 80 minutes'	E1	Allow, e.g. 'graph only goes up to 80 (minutes)' 'only shows to 1 hour 20 minutes' 'doesn't show above 80 minutes' 'the graph doesn't extend that much' 'the bar doesn't go up to 1 hour 25 minutes' 'the bar doesn't go up to 85 minutes' 'no one spent 1 hour 25 minutes in the gym' 'the maximum he could have spent was 1 hour 20 minutes' '85 minutes was not recorded' 'goes no later than 1 hour 20 minutes' Do not accept, e.g. 'the graph only gives 20 minute time groups (slots)' 'because in a frequency graph there is no way to know who is Freddie' 'he spent 1 hour 20 minutes in the gym' 'he spent an hour in the gym' 'the graph shows he didn't spend 1 hour 25 minutes in the gym' '1 hour 25 minutes is 85 minutes'
6(b) 14	B1	
6(c) 38	B1	
6(d) (Total number of men) 14 + 22 + 48 + 16 OR (Total number of women) 12 + 26 + 54 + 22 (Total men) 100 AND (Total women) 114 Method considering proportions, e.g. sight of any of: • $\frac{48}{100}$ AND $\frac{54}{114}$ • 48% of 114 • $\frac{54}{114}$ of 100 'False' unambiguously selected or implied **and** accurate appropriate calculations to justify choice of 'False', e.g. • 48% **and** 47(.3...)% or 47.4% • 0.48 **and** 0.47(3...) • (48% of 114 =) 54.7(2) **and** 54 (women)	 M1 A2 M1 A1	Check the graphs for working FT 'their 12 + 26' from (c), i.e. 'their 38' + 54 + 22 A1 for either total correct FT 'their 48, 100, 54, and 114' providing at least two of them are correct and 'their total for men 100' ≠ 'their total for women 114' Allow 'True' if justified by correct calculations from their 4 values.

7(a) Whiskers at 3 m and 22 m Unambiguous values or box with LQ 5 m and UQ 20 m Median at 15 m	B1 B1 B1	Ignore if lines omitted from the ends of the whiskers Must be the least and greatest values shown May be seen in working, must be clearly LQ and UQ Check cumulative frequency diagram If not clearly labelled in working or on the graph, they must be no other values given between • the least and the LQ, and • the greatest and the UQ May be seen in working, must be clearly the median Check cumulative frequency diagram If not an unambiguous unique line or point, i.e. not clearly labelled in working or on the graph, allow for a line (or point) indicated that is not the least or greatest value shown Only if B1 B1 B1 awarded, penalise -1 if a correct format for a box-and-whisker diagram is not shown
7(b)(i) 0.75 × 68 or equivalent 51 (yachts)	M1 A1	Answer space takes precedence If no marks, award SC1 for sight of 17 (from 0.25 × 68)
7(b)(ii) Conclusion 'Eog' with sight of (Eog IQR 20 – 5 =) 15 (m) AND (Clwyd IQR 18 – 10 =) 8 (m)	B2	FT 'their UQ – LQ' from (a) box-and–whisker diagram B1 for either IQR correct
7(b)(iii) Conclusion 'Can't tell' with reason, e.g. 'only know that 25% of yachts in Clwyd Marina are greater than 18m' 'we don't know if any of the yachts in Clwyd Marina are greater than 22(metres, the longest in Eog Marina)' 'we don't know if a yacht in Clwyd Marina is greater than 22(metres)' 'it doesn't say maximum length of Clwyd Marina's results'	E1	Ignore any additional incorrect or spurious statements Allow 'Can't tell' with a reason, e.g. 'no raw data' 'don't know this information' 'doesn't show anywhere the biggest yacht in Clwyd Marina' 'we are only given some of the lengths of the yachts in the marinas' 'doesn't show Clwyd Marina's results' 'not specified' 'not specific' 'range not given for the Clwyd Marina (so can't identify the longest yacht)' Do not accept, e.g. 'don't know how many yachts in the marinas' 'not mentioned for either marina'

7(a) $4500 \times (1 - 0.2(0)) \times (1 - 0.14)^9$ or $4500 \times 0.8(0) \times 0.86^9$ or equivalent	M2	For M2, do not ignore any additional years considered, unless 10 years selected or implied in later working M1 for equivalent of one of the following (which may be embedded in other working): • $4500 \times (1 - 0.2(0))$ (= 3600) • $4500 \times 0.8(0)$ (= 3600) • $4500 \times (1 - 0.14)^9$ (= 1157.97...) • 4500×0.86^9 (= 1157.97...)
An answer in the range (£)926.35 to (£)926.40	A1	An answer for 10 years (not beyond) must be selected Allow an answer of (£)926 provided not from rounding an amount outside the range given Award M1, SC1 for an answer $(4500 \times 0.8 \times 0.86^{10} =)$ (£)796.68(5....) or (£)796.69 or (£)796.70 or (£)797
7(b) $100 \times 750 \div 125$ or $100 \times \frac{750}{125}$ or equivalent	M1	
(£) 600	A1	Answer space takes precedence
7(c)		Accept equivalents using the sine rule throughout '½ width' may be referred to by any unknown
Sight of appropriate 80 (cm) (height of triangle)	B1	Check if indicated on the diagram
(½ width =) $\frac{80}{\tan 33°}$ or (½ width =) $80 \times \tan(90° - 33°)$	M2	(= 123.189... cm or 123.2 cm) FT 'their 80' provided ≤ 120 and ≠ 90 M1 for sight of $\tan 33° = \frac{80}{\text{½ width}}$ or $\tan(90° - 33°) = \frac{\text{½width}}{80}$
× 2	m1	FT provided at least M1 previously awarded, i.e. for intention to double 'their ½ width'
(Width of garage is) 246(cm) to 246.4(cm)	A1	CAO. ISW
7(d) (Maximum space =) 555 – 395 – 70 or 550 – 400 + 2 × 5 – 70 or equivalent	M2	Check the diagram M1 for any of the following: • **use** of 550 < 'their 555' ≤ 560 AND 390 ≤ 'their 395' < 400 • for sight of 555 and 395 • for sight of 550 – 400 + 2 × 5
90 (cm)	A1	CAO Award M1 and SC1 for an answer of (555 – 395 =) 160 (cm)

8. 360 (°) – 240(°) (= 120°) 120(°) ÷ 6 20(°)	M1 m1 A1	Award M1 for sight of 120(°) FT 'their 120' CAO

13.(b) Pie chart drawn correctly and both sectors labelled correctly Angle for Red = 100° Angle for Yellow = 80°	B2	For B2, FT their angles from (a), provided they add up to 180°. Allow tolerance of ±2° for all angles. Award B1 for one of the following: • correct angles but both not correctly labelled (1 or 2 omitted or reversed) • one correct angle (from FT) and correctly labelled.

13.(c)	$\frac{70}{90}$	OR	$\frac{7}{9}$	OR	$\frac{280}{360}$	or equivalent. ISW	B2	FT 'their 45' + 25 or 'their 100°'+ 180°, where possible. Award B1 for one of the following: • a numerator of 70 or 280 in a fraction < 1 • a denominator of 90 or 360 in a fraction < 1 • sight of adding two correct fractions for red and blue. Penalise incorrect notation (e.g. '70 in 90') −1.

14. *(a)* Any valid explanation or counter example e.g. "2 is a prime" "2 is even" "2 is not odd"	E1	Do not accept 2 alone The number 2 must appear in the explanation.
14. *(b)* Any valid explanation or counter example e.g. "8 is a cube" "64 is even"	E1	Do not accept number alone, but allow e.g. $2^3 = 8$ A numerical example must appear in the explanation. If a numerical example is given it must be correct or not contradicted e.g. "2 × 2 × 2 = 16 is even" would be awarded E0 "2 × 2 × 2 is even" would be awarded E1. If two examples are given, one must be correct for E1 If no marks awarded in (a) and (b), award SC1 for correct number only in **both** parts e.g. 2 in (a) **AND** 8 (or any other even cube) in (b)

15. $YZ = \frac{7}{\cos 41(°)}$ or $7 \div \cos 41(°)$	M2	Award M2 for $YZ = 7 \div \sin 49 (\times \sin 90)$ or $\frac{7 (\times \sin 90)}{\sin 49}$ Award M1 for one of the following: • $\cos 41 = \frac{7}{YZ}$ • $\sin 49 = \frac{7}{YZ}$ • $\frac{YZ}{\sin 90} = \frac{7}{\sin 49}$.
= 9·27(…) or 9·28 (cm) or 9.3 (cm)	A1	Accept 9 (cm) from correct working. CAO.
15. Alternative method: ***Correct** use of 'two-step' method.*	*M2*	*A partial trigonometric method is M0.*
= 9·27(…) or 9·28 (cm) or 9.3 (cm)	*A1*	*Accept 9 (cm) from correct working.*

16. 25·55 (seconds) – 12·35 (seconds) OR 25·5 (seconds) – 12·4 (seconds) + 2 × 0·05 (sec)	M2	Award M2 for **USE** of the correct bounds. If many attempts are offered without a method/answer being identified, then mark the final attempt. If M2 not gained, award M1 A0 for correct **USE** of values $12{\cdot}3 \leq t < 12.4$ and $25.5 < t \leq 25{\cdot}6$. [Note: $25{\cdot}54\dot{9}$ is equivalent to 25·55 and with an answer of 13.2 (seconds) gains all 3 marks]
= 13·2 (seconds)	A1	CAO. Mark final answer. Unsupported 13·2 is awarded M2 A1.

5. $2(n-7)$ or equivalent e.g. $2n-14$.	B3	Answer space takes precedence. For B3, accept as a final answer of: • $2\times(n-7)$ • $(n-7)2$ • $(n-7)\times 2$. Award B2 if incorrect subsequent working for one of the above. Award B2 for sight of one of the following: missing brackets: • $2\times n-7$ • $n-7\times 2$ error in Samir's age: • $2(n+7)$ • $2\times(n+7)$ • $(n+7)2$ • $(n+7)\times 2$ • $2(7-n)$ • $2\times(7-n)$ • $(7-n)2$ • $(7-n)\times 2$ • $2n+14$ • $14-2n$ Award B1 for sight of one of the following: • $n-7$ • $2\times n+7$ • $n+7\times 2$ • $2\times 7-n$ • $7-n\times 2$ • $2n-7$ • $n-14$ • $n-72$. Allow use of a different letter for n.

8.(b)(ii) (w =) 103.1	B1	Accept embedded answers, unless contradicted.
9.(a) $\frac{3}{8} \times 142$ OR $(142 \div 8) \times 3$ = 53.25 ISW	M1 A1	Award M1 A0 for one of the following: • $\frac{213}{4}$ • $53\frac{1}{4}$ • $426 \div 8$ • An unsupported 53.3
9.(b) 17.16 ISW	B1	

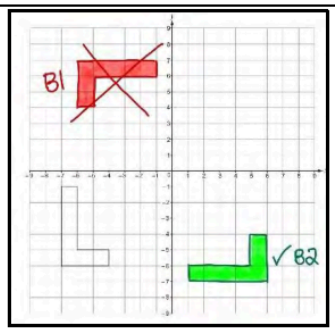
15.(a) $(x =)$ $\sin^{-1}\frac{7\cdot7}{11\cdot3}$ or $\sin^{-1}\frac{7\cdot7 \times \sin 90}{11\cdot3}$ or equivalent Allow an answer between 42·8 and 43(°) ISW	M2 A1	Check diagram for answers Award M1 for one of the following: • $\sin x = \frac{7\cdot7}{11\cdot3}$ (= 0·68(1..)) • $\frac{\sin x}{7\cdot7} = \frac{\sin 90}{11\cdot3}$ or equivalent Allow correct angles given in radians or gradians: Method: $\sin^{-1}\frac{7\cdot7}{11\cdot3}$ — Radians: 0·7496… — Gradians: 47·727…. Method: $\sin^{-1}\frac{7\cdot7 \times \sin 90}{11\cdot3}$ — Radians: 0·655… — Gradians: 47·001
15.(a) Alternative method ***Correct** use of a 'two-step' method.* Allow an answer between 42·8 and 43(°) ISW	*M2* *A1*	*A partial trigonometric method is M0.* *Allow 42·8(…°)* *Allow correct angles given in radians or gradians.*

$DBE = (90 - 43) = 47(°)$ OR $BED = 43(°)$	B1	**Strict FT** for $DBE = 90 -$ 'their x' or $BED =$ 'their x', provided 'their x' $\neq 45°$. Note: DBE must be acute for B1. May be implied in further work.
Valid method to find the length DE $DE = 13{\cdot}1 \times \tan 47$ $DE = \frac{13{\cdot}1}{\tan 43}$ $DE = \frac{13{\cdot}1 \times \sin 47}{\sin 43}$	M2	If B1 already awarded for 'their angle DBE' but then 'their angle BED' is incorrect and 'their BED' is then used (or vice versa) for either M2 or M1, then award B0 previously. Or award M2 for correct use of a 'two-step' method (e.g. 'Pythagoras and similar triangles' or 'Pythagoras and correct trigonometric relationship'). FT 'their angle DBE' or 'their angle BED' provided not 0°, 45°, 90° or 180°. Award M1 for one of the following: • $\tan 47 = \frac{DE}{13{\cdot}1}$ • $\tan 43 = \frac{13{\cdot}1}{DE}$ • $\frac{DE}{\sin 47} = \frac{13{\cdot}1}{\sin 43}$ or equivalent For all M2 or M1 scenarios, FT their clearly stated or shown angle BED or DBE where appropriate. For $\frac{13{\cdot}1 \times \sin 47}{\sin 43}$ FT their clearly stated or shown angles BED and DBE **only** if $BED + DBE = 90°$.
DE in the range 14·04 to 14·1 (cm) ISW	A1	Allow 14 from correct workings. FT from M2 only and provided that angle is acute and leads to a positive answer. Award B1M2A0 for any of the following unsupported answers:

Method	Radians	Gradians
$13{\cdot}1 \times \tan 47$	-1·63 to 1…	11·92 to 12
$\frac{13{\cdot}1}{\tan 43}$	-8·743 to -5·36	16·35 to 16·5
$\frac{13{\cdot}1 \times \sin 47}{\sin 43}$	-1·95 to 1·08	14·1 to 14·21

16.(a)	28	B1	Allow B1 for a correct embedded answer (e.g. 28 ÷ 4 = 7 BUT B0 if contradicted by total ≠ 28). Allow the sequence 7,14,21,28 for B1, but only if no further numbers are shown.

16.(b) Four numbers (in any order) with a total of 28 and range of 6 e.g. 3 7 9 9 3 8 8 9 4 7 7 10 4 6 8 10 4 5 9 10 4 4 10 10 5 5 7 11 5 6 6 11	B2	Numbers may be seen in any order. Accept answers using fractions and decimals. FT 'their total' from 16(a). Award B1 for **four** numbers with one of the following: • total = 28 • total = 'their total' from 16(a) • range = 6.

20.		B2	Award B2 for the correct rotation drawn with no other shapes drawn on the grid. Award B1 for a 90° correct clockwise rotation with either: • no other shapes drawn on the grid • the correct rotation (no others).

2.(a) 106000	B2	B1 for one of the following: • sight of 53000 • one hundred and six thousand • correctly doubling 'their 53 000' if it is first written in figures, provided 'their 53 000' is at least four figures and starts with the digits 5 and 3 (i.e. a place value error). • 106 followed by a minimum of two zeros
2.(b) 3600	B1	
2.(c) 42	B1	
2.(d) 1000 OR 980 OR 1030	B2	B1 for 100 × 10 OR 100 × 9·8 OR 103 × 10
2.(e) No, with appropriate working e.g. • (626 ÷ 3 =) 208 r.2 • (626 ÷ 3 =) 208·6(6…) • 6 + 2 + 6 = 14 AND 14 is not a multiple of 3 • 3 × 208 = 624 AND 3 × 209 = 627	B1	Allow No with 208·2 Arithmetic seen must be correct and show a remainder of 2 or first decimal place.

5(a) 209° ± 2°	B1	Answer space takes precedence
5(b)(i) Answer in the range 21 (km) to 25 (km)	B1	Answer space takes precedence
5(b)(ii) Correct interpretation of the map scale, e.g. • 1 cm represents 25 000 cm or 250 m • 2 cm represents 50 000 cm or 500 m or 0.5 km • 4 cm represents 100 000 cm or 1 000 m or 1 km OR Correct conversion 12 km to cm, 25 000 cm to km or equivalent, e.g. • (12 km =) 1 200 000 (cm) • (25 000 cm =) 0.25 (km) • sight of 1200 and 25 • sight of 12 and 0.25	B1	
12 ÷ 0.25 or 12 × 4 or 1 200 000 ÷ 25 000 or 1 200 ÷ 25 or equivalent	M1	Ignore place value error, e.g. 12 ÷ 'their number with digits 25', 12 × 'their number with digit 4'
48 (cm)	A1	CAO
5(b)(ii) Alternative method *(Original map scale is 3 cm : 12 km =)* *3 : 1 200 000 or 1 : 400 000 or equivalent*	*B1*	
$\frac{400\,000}{25\,000}$ × 3 or 16 × 3 or equivalent	*M1*	*Ignore errors in place value*
48 (cm)	*A1*	*CAO*

7(a) $5 \times 42 - (40 + 37 + 39 + 48)$ or $210 - 164$ or equivalent OR $40 + 37 + 39 + 48 + \ldots = 5 \times 42$ or $164 + \ldots = 210$	M2	May be shown in stages Allow missing brackets as the intention to subtract M1 for sight of any one of the following: • 5×42 or 210 (mm) • the idea that $(40 + 37 + 39 + 48 + x) \div 5 = \mathbf{42}$, where x may be a gap, variable or a trial
(Friday) 46 (mm)	A1	CAO. Do not award from incorrect working Answer space takes precedence Do not allow an embedded answer
7(a) Alternative methods *(Difference from mean) $42 + 2 + 5 + 3 - 6$* *OR* *(Contributions to the mean each day)* *$5 \times (42 - \frac{40}{5} - \frac{37}{5} - \frac{39}{5} - \frac{48}{5})$ or equivalent* *(= 5 × 9.2)*	*M2*	*M1 for $42 - \frac{40}{5} - \frac{37}{5} - \frac{39}{5} - \frac{48}{5}$*
(Friday) 46 (mm)	*A1*	*CAO. Answer space takes precedence*

7(b) $5 \times 42 \div 7$ or $210 \div 7$		M1	Allow 'their 46' from (a) has been truncated or rounded, FT any of the following: • 'their 5×42' $\div 7$ • ('their $40 + 37 + 39 + 48$' + 'their 46') $\div 7$ • $(164 +$ 'their 46'$) \div 7$
	30 (mm)	A1	Answer space takes precedence On FT, accept rounded or truncated answers provided working is shown

9. $2500 \times (1 - 0.23) \times (1 - 0.04)^{39} \times (1 + 0.14)^{10}$ or $2500 \times 0.77 \times 0.96^{39} \times 1.14^{10}$ or equivalent	M3	May be seen in stages M2 for a product with any 3 correct terms OR M1 for a product with any 2 correct terms
(£) 1452(.30)	A1	CAO, ignore premature rounding in working provided answer is (£) 1452.(…), allow rounded to (£)1450 from correct working

19. Method using angle *XYZ* $YZ = \frac{18{\cdot}6}{\tan 40(°)}$ or $\frac{18{\cdot}6 \times \sin 50}{\sin 40}$ or equivalent = 22(·166..)(cm)	M2 A1	Check diagram for answer. Award M1 for one of the following • $\tan 40(°) = \frac{18{\cdot}6}{YZ}$ • $\frac{YZ}{\sin 50} = \frac{18{\cdot}6}{\sin 40}$ or equivalent Accept an answer rounded or truncated. Award M2A0 for any of the following unsupported answers: Method: $\frac{18{\cdot}6}{\tan 40}$ — Radians: -16·648.... — Gradians: 25·600...
19. Alternative using angle YXZ *$YZ = 18{\cdot}6 \times \tan 50(°)$* *= 22(·166..)(cm)*	*M2* *A1*	*Award M1 for $\tan 50(°) = \frac{YZ}{18{\cdot}6}$* *Accept an answer rounded or truncated* *Award M2A0 for any of the following unsupported answers:* *Method: 18·6 × tan 50 — Radians: -5·057.... — Gradians: 18·6*
19. Alternative method ***Correct** use of a 'two-step' method.* *22(·166..)(cm) ISW*	*M2* *A1*	*A partial trigonometric method is M0.* *Accept an answer rounded or truncated.*

Unit 1: Foundation Tier	Mark	Comments
1.(a) 562000	B1	
1.(b) 42900	B1	Accept forty-two thousand (and) nine hundred

3.(c)(ii)	0	B1	
4.(a)	$\frac{55}{66}$ $\frac{35}{42}$	B2	B1 for either: • two correct answers circled, with one incorrect answer. • one correct answer circled, with up to one incorrect answer.
4.(b)	0·05	B1	Accept $\frac{1}{20}$. B0 for 1 ÷ 20.
4.(c)	3 6 AND 5 7 OR 5 7 AND 3 6	B2	B1 for an answer of either: • 3 7 AND 5 6

Unit 2: Intermediate Tier	Mark	Comments
4.		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 (Cost of gas = Number of kWh) × 0(.)12	M1 m1	(= 1548.4474 kWh)
(£)185.76 to (£)185.82 or 18576(p) to 18582(p)	A1	(1548.4474 × 0.12 = £185.813688)
(Standing charge 30 × (0.)32 =) (£)9.6(0) or 960(p)	B1	CAO
(Total of gas and standing charge) *(£)195.36 to (£)195.42 or 19536(p) to 19542(p)	B1	FT 'their derived cost of gas' + 'their 30 × (0.)32' correctly evaluated, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh May be implied in later working
(Total including VAT =) 1.05 × 195(.)36 to 1.05 × 195(.)42	M1	FT 'their derived total cost of gas **+** 'their standing charge'
*(£)205.12 to (£)205.19(1) or 20512(p) to 20519(.1p)	A1	ISW further rounding, e.g. (£)205, (£)205.20 If final B0 B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas' having omitted the standing charge, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*
4. Alternative method: Gas per day		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6 *(Number of kWh per day) ÷ 30* *(Cost of gas per day) × 0(.)12*	*M1* *m1* *m1*	*(= 1548.4474 kWh)* *(= 51.6149133…kWh)*
(Cost of gas per day =) (£)6.19(…) or 619(…p)	*A1*	*CAO*
(Total of gas and standing charge) *6.51(…) or 651.(…p)*	*B1*	*FT 'their derived cost of gas per day' + (0.)32 correctly evaluated* *May be implied in later working*
(Total including VAT =) *1.05 × 6.51(…) × 30*	*M1*	*(= 6.83(94…) × 30 or 6.84 × 30)* *FT 'their derived cost of gas per day **+** (0.)32, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh*
**(£)205.12 to (£)205.19(1)* *or 20512(p) to 20519(.1p)*	*A1*	*ISW further rounding, e.g. (£)205, (£)205.20* *If final B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas per day' × 30 having omitted the standing charge,* provided 'their cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh **Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*

Unit 2: Foundation Tier	Mark	Comments
7.(a) A correct explanation, e.g. • 'She hasn't used BIDMAS/ BODMAS/ Order of Operations'. • 'You must multiply before you add' • 'She should have multiplied first' • 'She has added the 10 and the 4 first, then multiplied by 9'	E1	Accept '10 + 36 = 46'. Award E0 for: • an unsupported 46. • '10 + 4 x 9 = 46'. • 'she added 10 and 4 together' • a correct explanation given but later contradicted • a correct explanation given with an incorrect answer to the calculation
7.(b) A correct explanation, e.g. • 'He has divided by 2 not divided by a half'. • 'He has worked out a half of 20 (not divided 20 by a half)'. • 'He should have multiplied by 2'. • 'He should have multiplied not divided'. • 'He should have divided by a half (not by 2)'	E1	Accept '20 ÷ ½ = 40' or '20 × 2 = 40'. Award E0 for: • a correct explanation given but later contradicted • an unsupported 40 • 'he shouldn't have divided by 2' • 'there are more than 10 halves in 20' • a correct explanation given with an incorrect answer to the calculation
7.(c) A correct explanation, e.g. • 'She hasn't calculated the difference between the biggest number and the smallest number'. • 'She should have done 20 – 1'	E1	Accept '20 - 1 = 19'. Allow: • 'range = largest – smallest' • 'she didn't put the numbers in order first (before finding the difference between the end numbers)' • '11 isn't the biggest number and 7 isn't the smallest number' Award E0 for: • an unsupported 19 • 1 – 20 (unless = 19 also seen) • '11 isn't the biggest number' • '7 isn't the smallest number' • 'smallest take away the biggest' • a correct explanation given but later contradicted. • a correct explanation given with an incorrect answer to the calculation
7.(d) A correct explanation, e.g. • 'They should halve (1/5 of the number to work out 1/10 of the number)'. • 'They should divide by 2'. 'They should multiply by 5 then divide by 10'	E1	Accept equivalent explanations.

Unit 1: Intermediate Tier	Mark	Comments
8. (Probability of winning score =) $\frac{3}{20}$ or equivalent	B2	Award B2 for sight of • $\frac{1}{4}\times\frac{3}{5}$ • '3 winners out of 20' • the 3 winning combinations/scores clearly identified in a list/table of the 20 possible combinations/scores. B2 may be implied in later workings. Award B1 for one of the following: • for convincing identification of the 20 combinations/scores, for example: ✓ sight of 20 ✓ 4 × 5 ✓ showing all 20 correct combinations 10 + 1,10 + 2...with no extras ✓ all 20 correct scores listed with no extras ✓ completed sample space drawn (4 by 5) ✓ sight of $\frac{1}{4}$ AND $\frac{3}{5}$ or equivalent. • identifying the three correct possible winning scores (43, 44, 45) with no extras • identifying the three correct winning combinations (40 + 3, 40 + 4, 40 + 5) with no extras • $\frac{3}{x}$ provided $x > 3$ and correct winning combinations/scores identified • $\frac{y}{20}$ provided with $y < 20$ • $\frac{3}{20}$ from incorrect winning combinations or scores identified • <u>strict FT</u> from 'their list' provided clearly stated $\frac{\text{'their number of winning scores'}}{\text{'their total number of possibles scores'}}$
(Number of winners =) $\frac{3}{20}\times 100$ or equivalent	M1	Award M1 for $\frac{1}{4}\times\frac{3}{5}\times 100$. May be implied e.g. 100 ÷ 20 = 5, 5 × 3 = 15. FT 'their probability of winning score' × 100, provided 'their probability of winning score' < 1, or $\neq\frac{x}{100}$. M0 awarded if 'their probability of winning score' is simplified incorrectly.
= 15	A1	May be implied by '15 out of 100' or equivalent. If 15 is not seen but final answer of £15 is given (i.e. 'people' confused with 'money') then allow only M1A0. Answer must be whole number.
(Profit =) (£)100 – 15 × (£)5 OR (£)85 – 15 × (£)4	M2	FT 'their number of winners', provided ≠ 3 and <100. Award M1 for one of the following: • 15 × (£)5 • an appropriate sight of (£)75 • 'their number of winners'× (£)5 • 'their number of winners'× (£)5 evaluated correctly • (£)100 – (£)15 AND 15 × (£)4 • (£)100 – 'their number of winners' × (£)1 AND 'their number of winners' × (£)4.
= (£)25	A1	FT provided M2 (not M1M1) previously awarded. **An unsupported** answer of (£)25 is awarded B2 M1A1M2A1.

8. <u>*Alternative method for the final 5 marks*</u> ***<u>Must clearly be working with groups of 20 throughout</u>***		
$20 \times (£)1 - 3 \times (£)5$	M2	*Method must be seen for M2.* *FT 'their 20' × (£)1 – 'their 3' × (£)5.*
$(£)5$	A1	*May be implied in later working.*
$\times \ 5$	m1	*FT 100 ÷ 'their 20'*
$=(£)25$	A1	

Unit 1: Intermediate Tier	Mark	Comments
9(a)(i) 1×10^5	B1	
9(a)(ii) A suitable calculation, including an appropriate approximation, e.g. $\frac{3\,100\,000}{21\,000}$ or $\frac{3\,100\,000}{20\,000}$ or $\frac{3\,000\,000}{20\,000}$ or $\frac{3\,000\,000}{21\,000}$ or equivalent Answer in the range 142 (people/km^2) to 155 (people/km^2)	M2 A1	Place value must be correct Must include an approximation M1 for the idea to divide (in the correct order), that may also include one place value error, e.g. $\frac{3.1\ million}{20\,735}$, $\frac{31\,000\,000}{20\,000}$, $\frac{3\,100\,000}{20\,700}$ ISW. Allow 142.8, 142.9 and 143 rounded to 140 Accept equivalents, e.g. 150 written as 1.5×10^2
9(b) Idea that 360 000 is 120% 360 000 ÷ 1.2 or equivalent 300 000 (people)	B1 M1 A1	Accept from sight of trial to increase 'their value' by 20% provided 'their value' <360 000 Award of M1 also implies previous B1
9(c) (Length) 6.6 ÷ (4.2 ÷ 1.4) or 6.6 ÷ 3 or equivalent Length 2.2 (cm) (Height) 4.2 × (9.9 ÷ 6.6) or 4.2 × 1.5 or 1.4 × (9.9 ÷ 2.2) or equivalent Height 6.3 (cm)	M1 A1 M1 A1	 FT 1.4 × (9.9 ÷ 'their derived length') Note: Length (from *9.9 – 6.6* =) *3.3*(cm) M0 A0 Height (from 1.4 × (9.9 ÷ *3.3*) =) *4.2*(cm) M1 A1 (FT) Allow answers reversed in the answer space
9(c) Alternative method *(Height) 4.2 × (9.9 ÷ 6.6) or 4.2 × 1.5 or equivalent* *Height 6.3 (cm)* *(Length) 6.6 ÷ (4.2 ÷ 1.4) or 6.6 ÷ 3* *or 9.9 ÷ (6.3 ÷ 1.4) or equivalent* *Length 2.2 (cm)*	*M1* *A1* *M1* *A1*	 *FT 9.9 ÷ ('their derived height' ÷ 1.4)* *Allow answers reversed in the answer space*

Unit 2: Foundation Tier	Mark	Comments
9.		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6	M1	(= 1548.4474 kWh)
(Cost of gas = Number of kWh) × 0(.)12	m1	
(£)185.76 to (£)185.82 or 18576(p) to 18582(p)	A1	(1548.4474 × 0.12 = £185.813688)
(Standing charge 30 × (0.)32 =) (£)9.6(0) or 960(p)	B1	CAO
(Total of gas and standing charge) *(£)195.36 to (£)195.42 or 19536(p) to 19542(p)	B1	FT 'their derived cost of gas' + 'their 30 × (0.)32' correctly evaluated, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh May be implied in later working
(Total including VAT =) 1.05 × 195(.)36 to 1.05 × 195(.)42	M1	FT 'their derived total cost of gas **+** 'their standing charge'
*(£)205.12 to (£)205.19(1) or 20512(p) to 20519(.1p)	A1	ISW further rounding, e.g. (£)205, (£)205.20 If final B0 B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas' having omitted the standing charge, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh *Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*
9. Alternative method: Gas per day		*Penalise incorrect units -1 only on first occurrence, by withholding A or B mark, not M marks*
(Number of kWh =) 138 × 39·5 × 1.02264 ÷ 3.6	*M1*	*(= 1548.4474 kWh)*
(Number of kWh per day) ÷ 30	*m1*	*(= 51.6149133…kWh)*
(Cost of gas per day) × 0(.)12	*m1*	
(Cost of gas per day =) (£)6.19(…) or 619(...p)	*A1*	*CAO*
(Total of gas and standing charge) *6.51(…) or 651.(…p)*	*B1*	*FT 'their derived cost of gas per day' + (0.)32 correctly evaluated* *May be implied in later working*
(Total including VAT =) *1.05 × 6.51(…) × 30*	*M1*	*(= 6.83(94…) × 30 or 6.84 × 30)* *FT 'their derived cost of gas per day **+** (0.)32, provided 'their derived cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh*
(£)205.12 to (£)205.19(1) *or 20512(p) to 20519(.1p)*	*A1*	*ISW further rounding, e.g. (£)205, (£)205.20* *If final B0 M0 A0, award SC1 for correctly evaluated final answer of 1.05 × 'derived cost of gas per day' × 30 having omitted the standing charge,* provided 'their cost of gas' ≠ 'their 138 × 39·5 × 1.02264 ÷ 3.6' or 1548.4474 kWh *Allow answers in these ranges that may include unseen rounding or truncation from a previously written value*

Unit 2: Intermediate Tier	Mark	Comments
9(a)(i) 5×10^8 or 5.0×10^8	B1	
9(a)(ii) **140** $\times 10^9$ $\div 300$ $\div 24$ 19 400 000 (kg per hour)	 M1 M1 M1 A2	Method marks can be awarded in any order but the operation must be unique (not contradicted or repeated in the working) '÷ 7200' implies final M1 M1 Award M3 for sight of $\frac{140 \times 10^9}{300 \times 24}$ or $\frac{1.4 \times 10^{11}}{7.2 \times 10^3}$ or equivalent ISW, accept 19.4 million or 1.94×10^7 or equivalent A1 for sight of 19 444 444(.44…) or for incorrect rounding or truncation of this answer FT, for A1, from M1 M0 M1 or M1 M1 M0, including if an incorrect 3rd term is included, for correct evaluation of 'their calculation' **and** expressing 'their final answer' correct to 3 significant figures provided rounding is required, e.g. • $140 \times 10^9 \div 300$ leading to 467 000 000 • $140 \times 10^9 \div 24$ leading to 5 830 000 000 • $140 \times 10^9 \div 300 \div$ *12* leading to *38 900 000* ($140 \times 10^9 \div 300 \times$ *24* = *11 200 000 000*, $140 \times 10^9 \div 24 \times$ *300* = *1 750 000 000 000*, *no rounding required, hence A0)* FT, for A1, from M0 M1 M1 for an answer of 194 000, 1 940 000, 194 000 000, or 1 940 000 000, provided it is from a correct evaluation of 'their calculation' If no marks, award SC1 for equivalent operations used without 140, i.e. $\frac{10^9}{300 \times 24}$ or $10^9 \div 300 \div 24$ or equivalent
9(b)(i) (Venus orbit) $2 \times \pi \times 1.08 \times 10^8$ or 678 000 000 to 680 000 000 or 6.78×10^8 to 6.8×10^8 (To find distance travelled in one day) $\div 224.7$ (Distance in one day) $3.(0....) \times 10^6$	M1 M1 A2	 FT 'their derived orbit' provided π is involved in 'their calculation of Venus orbit' CAO A1 for any one of the following answers: • (not in standard form) 3 000 000 (km) • (incorrect standard form) e.g. 30×10^5 • (in the range) 3 017 000 (km) to 3 026 300 (km) • (in terms of π) e.g. 961 281.7089π (km) • ($\pi \times 1.08 \times 10^8 \div 224.7 =$) $1.5(\ldots) \times 10^6$ If no marks, award SC1 for an answer of $4.8(0\ldots) \times 10^5$ (from $1.08 \times 10^8 \div 224.7$) or $9.6(1\ldots) \times 10^5$ (from $2 \times 1.08 \times 10^8 \div 224.7$)

Unit 2: Intermediate Tier	Mark	Comments
9(b)(ii) 368 187 456 (km^2)	B3	ISW Allow appropriate rounding from correct working, such as 368 187 500 or 368 000 000 or 370 000 000 B2 for any one of the following: • 8 × 460 234 320 ÷ 10 • 7 × 460 234 320 ÷ 10 + 460 234 320 ÷ 10 • 460 234 320 – 2 × 460 234 320 ÷ 10 • (2 × 460 234 320 ÷ 10 =) 92 046 864 • (7 × 460 234 320 ÷ 10 =) 322 164 024 B1 for any one of the following, including embedded in other working: • 460 234 320 ÷ 10 • (460 234 320 ÷ 10 =) 46 023 432 *If errors in calculating 1 + 7 or 1 + 2 + 7 are seen, then award B2 or B1 as appropriate e.g.* • *1 + 7 = 9, 9 × 460 234 320 ÷ 10* *B2* • *9 × 460 234 320 ÷ 10* *B1 (embedded 460 234 320 ÷ 10)*

Unit 1: Foundation Tier	Mark	Comments
11. 5, 7, 7, 9 (in any order)	B3	Answer boxes take precedence. Four numbers must be given for B3 or B2 to be awarded B3 for 7, 7, 5, 9 B2 for mode = 7 AND total = 28 • 7, 7, a, b where a+ b = 14 and a and b can be any numbers (negative, fractions, decimals, even number or ≥10) e.g. 7, 7, 2, 12 • NOT 7, 7, 7, 7 At least 2 numbers must be given for B1 to be awarded. B1 for mode = 7 OR total = 28 Examples include: • 7,7,7,7 • 7,7,7,14 (mode = 7, total ≠ 28) • 7, 7, blank, blank (mode = 7, total ≠ 28) • 7, 3, 9, 9 (mode ≠ 7, total = 28) • 7, 9, 12, blank (mode ≠ 7, total = 28) B1 for 7,7,14, blank (mode = 7, total = 28) B0 for 7, blank, blank, blank,

18. Sight of $2x + 3y = 13$ AND $8x - 3y = 22$	B1	Award B1 for sight of $(2x + 3y) + (8x - 3y) = 13 + 22$. May be implied in later working.
Method to eliminate one variable e.g. (equal coefficients **AND)** <u>appropriate intention to</u> add or subtract or use a method of substitution.	M1	FT 'their equations' if of equivalent difficulty. If <u>equating coefficients</u>, allow one error in one term (not the term with equal coefficients). Sight of $10x = 35$ implies B1M1.
First variable found $x = 3{\cdot}5$ or $y = 2$ or equivalent	A1	CAO. Award A1 for $2x = 7$.
Second variable found	A1	FT substitution of their '1st variable' if M1 gained. Accept an answer rounded, truncated or as an improper fraction (if not whole number) on FT, provided > 0.
(Perimeter of triangle = 3·5 + 3·5 + 2 =) 9 (cm)	B1	FT 'their derived x and y', provided an algebraic method is used and both > 0. If the first B0 or B1 awarded, then award an additional SC1 for one of the following: • sight of x = 3·5 AND y = 2 (if M0 awarded) • an unsupported answer of 9 (cm).

2(a) 30 000 or thirty thousand or 30 thousand	B1	ISW Accept 'ten thousands' or 'tens of thousands' Do not accept 10 000 or 'ten thousand'.
2(b) 1364	B1	
2(c) 382	B1	

4.(a)	Bethan = **14** (years old) Andrew = **21** (years old) Richard = **24** (years old)	B2	For B1, check for the required conditions being met and not the individual numbers. *Required conditions (or equivalent) are:* $B + A + R = 59$ $A - B = 7$ $R - A = 3$ $R - B = 10$ Award B1 for one of the following: • two conditions correct • 14, 21, 24 allocated to the incorrect people e.g. **B** = 14, **A** = 24 and **R** = 21 (correct answer not seen in working space). A condition must be met using non-negative ages, otherwise B0. Values on the answer lines take precedence. However, award B2 for one of the following: • the answer lines are left blank and the correct answers (correct ages allocated to the correct people) are seen in the working space • the correct answers (correct ages allocated to the correct people) are seen in the working space, but ages allocated to the incorrect people on the answer lines.
4.(b)(i)	27 : 30 9 : 10	B1 B1	Answer line takes precedence. Must be in a ratio for B1. Award B1 for one of the following: • simplifying 27 : 'their 30' correctly evaluated • an answer of 7 : 8 (from 21 : 24) • 10 : 9 (unsupported or from 30 : 27). Award B1 B1 for an unsupported answer of 9 : 10.

4.(b)(ii) Valid explanation e.g. "they are not the same age" "Andrew is younger (so they can't be the same)" "Richard is older (so they can't be the same)" "Richard is 3 years older" "They'll always be different" "(there's a) difference in their ages" "their ages are not equal" "they are 3 years apart" "1:1 means they are the same age" "there's a gap (in their ages)" "they were born different dates"	E1	Do not allow FT from 4(b)(i). Do not allow: • further spurious **incorrect** comments e.g. "they are 3 years apart, so their ratios have to add to 3" • "Andrew will always be older" • "Because Andrew is 7 years older".

5. A suitable calculation to allow comparison e.g. • 5 minutes 8 seconds ÷ 2 • (5 × 60 + 8) ÷ 2 (= 308 ÷ 2) • 2 minutes 54 seconds × 2 • (2 × 60 + 54) × 2 (= 174 × 2) NO, with sight of one of the following: • 2 minutes 34 seconds • 5 minutes 48 seconds • 154 (seconds) AND 174 (seconds) • 308 (seconds) AND 348 (seconds)	M1 A1	Allow incorrect notation for time e.g. • 5.08 (min) • 2.54 (min) • 508 (sec) • 254 (sec) Accept equivalent statements to NO e.g. Sophie is wrong
Alternative method 1 *Finding the difference between the two times and comparing with 2 minutes 54 seconds* *NO, with comparison* *e.g. 2 minutes 14 seconds is less than 2 minutes 54 seconds OR 174 seconds is more than 134 seconds*	*M1* *A1*	*Allow incorrect notation for time e.g.* *5.08 – 2.54 (min) OR 508 – 254 (sec)* *(possible use of decimal points)*
Alternative method 2 *Converting both times to seconds, before dividing one quantity by the other* *NO, with sight of 1.7(70...) OR 0.56(4...)*	*M1* *A1*	*Allow incorrect notation for time e.g.* *508 ÷ 254 (sec)*

9.(a) − 17 − 6 3 12	B1	This order only
9.(b) − 4·6	B1	
9.(c) − 32	B1	

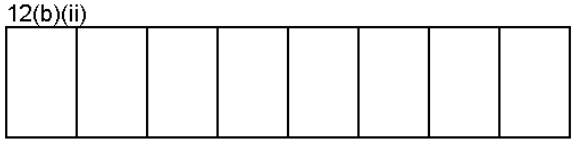
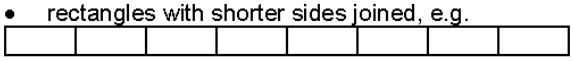
9(a) (Length of the flagpole below the rod =) $3.8 \times \sin 55°$ or $3.8 \times \cos(90° - 55°)$ or $380 \times \sin 55°$ or $380 \times \cos(90° - 55°)$	M2	Or alternative full method M1 for correct working without isolating 'length' $\sin 55° = \frac{\text{length}}{3.8}$ or $\cos(90° - 55°) = \frac{\text{length}}{3.8}$ or $\sin 55° = \frac{\text{length}}{380}$ or $\cos(90° - 55°) = \frac{\text{length}}{380}$
3.11(2…m) or 311(.2.. cm)	A1	Allow 3.1 (m) or 310 (cm)
(Total length 1.5 + 3.11 =) 4.61 (m) or 461 (cm)	A1	Must be to the nearest cm FT provided at least M1 previously awarded, i.e. for 1.5 + 'their 3(.)11' correctly evaluated, to nearest cm, and 'their 3.11' is to at least 2 decimal places If units are given they must be correct
9(b)(i) $120 \times 64 \div 80$ or 64×1.5 or 120×0.8 or $120 \div 1.25$ or $64 \div \frac{2}{3}$ or equivalent	M1	
96 (cm)	A1	Answer space takes precedence
9(b)(ii) $75 \times 80 \div 120$ or $75 \div 1.5$ or $75 \times \frac{2}{3}$ or $80 \div 1.6$ or 80×0.625 or $64 \times 75 \div 96$ or equivalent	M1	FT from (b)(i) $64 \times 75 \div$ 'their 96' or equivalent
50 (cm)	A1	Answer space takes precedence

11.

INPUT	OUTPUT
−7	**−15**
−24	−100
2·5	**32·5**
n	**$5(n+4)$**

B1	Mark final answer in table. If answers are not given in table, they must be clearly identified in the working space.
B1	
B1	
B2	Must include brackets or be fully simplified for B2. Award B2 for one of the following (or equivalent) as a final answer: • $5(n+4)$ • $5(4+n)$ • $5n+20$ • $5\times(n+4)$ • $(n+4)5$ • $(n+4)\times 5$. Award B1 for one of the following (or equivalent) as a final answer: • $n+4\times 5$ • $5\times n+4$ • sight of correct expression with incorrect final answer (e.g. $5(n+4)=5n+4$ or $5(n+4)=n$) • … $n+20$ • $5n+$ …

12(a) 2.425 m	B1	

12(b)(i) Sight of 2.595 (m) or equivalent in cm or mm	B1	Award B1 for sight of 4 × 0.005 in an appropriate calculation Allow 0.004999(....) for 0.005, must clearly be a recurring 9 digit
4 × 2.595 or 4 × 2.59 + 4 × 0.005 (= 10.36 + 0.02) or equivalent	M1	Or equivalent in cm or mm If B0, FT provided unambiguously chosen: FT 2.59 < 'their 2.595' ≤ 2.6
10.38(0 m)	A1	CAO, must be given in metres
12(b)(ii) 	B1	**Intention** to show 8 equal containers. Allow if: • there is very small gap (≈1mm) is shown between each of the containers • rectangles are not quite all the same size • a couple of the rectangles appear to be closer to squares • drawn free hand Do not accept if: • rectangles are shown as all squares • rectangles with shorter sides joined, e.g.  B0 for an 8 by 4 grid of squares or rectangles drawn
12(c) Complete method to calculate the percentage increase • $\frac{1.2 \times 10^8 - 2 \times 10^7}{2 \times 10^7}$ (× 100) • 5 (× 100) • $\frac{1.2 \times 10^8}{2 \times 10^7}$ (× 100) – 1(× 100) • 6 (× 100) – 1(× 100)	M2	<u>Allow place value errors in writing the given standard form numbers in full for M2 and M1 only</u> M1 for any one of the following calculations or evaluations: • $1.2 \times 10^8 - 2 \times 10^7$ (= 1×10^8 = 100 000 000) • $\frac{1.2 \times 10^8}{2 \times 10^7}$ (= 0.6 × 10 (× 100) or 6(× 100) or 600(%))
500 (%)	A1	CAO Answer space completing the statement takes precedence Accept equivalents 0.5×10^3 or 5×10^2 Accept an unsupported correct answer or a correct answer from reverse calculations

14.(a) $(AC^2 =)\ 13{\cdot}5^2 + 10{\cdot}8^2$ or equivalent $(AC =)\ \sqrt{13{\cdot}5^2 + 10{\cdot}8^2}$ or equivalent $(AC =)$ 17·3 or 17·2(88…) or 17·29 or $\frac{27\sqrt{41}}{10}$ (cm)	M1 m1 A1	Check diagram for answers. $(AC^2 =)\ 182{\cdot}25 + 116{\cdot}64 = 298{\cdot}89$. $(AC =)\ \sqrt{298{\cdot}89}$. Sight of √'their 298·89' or √'their 298·89' evaluated is awarded m1 provided M1 previously gained. CAO. Mark final answer. Allow 17 provided from correct workings. Final answer of AC = 298·89 is M1m0A0. Accept a rounded or truncated answer. An unsupported correct answer is awarded M1m1A1.
14.(a) Alternative method ***Correct** use of a two-step trigonometric method* *(AC =)* *17·3 or 17·2(88…) or 17.29 or $\frac{27\sqrt{41}}{10}$ (cm)*	*M2* *A1*	*A partial trigonometric method is awarded M0.* *CAO.* Mark final answer. *Allow 17 provided from correct workings.* *Accept a rounded or truncated answer.*
14. (b) $(x =)\ \tan^{-1}\frac{19{\cdot}8}{8{\cdot}7}$ An answer in the range 66·2 to 66·32	M2 A1	Check diagram for answers. Award M1 for $\tan x = \frac{19{\cdot}8}{8{\cdot}7}$ (= 2·275(8..) Mark final answer. Allow 66 provided from correct workings. Accept a rounded or truncated answer. Allow correct angles given in radians or gradians. $\tan^{-1}\frac{19{\cdot}8}{8{\cdot}7}$: Radians 1·1567…; Gradians 73·6440…
14.(b) Alternative method ***Correct** use of a two-step trigonometric method* *An answer in the range 66·2 to 66·32*	*M2* *A1*	*A partial trigonometric method is awarded M0.* Mark final answer. *Allow 66 provided from correct workings.* *Accept a rounded or truncated answer.* *Allow correct angles given in radians or gradians.*

17.		Answer line takes precedence. Operations can be made in any order.
$3{\cdot}2 \times 10^4 \div 1000 \div 8 \times 5$ or equivalent	M2	Award M1 for sight of one the following: • $3{\cdot}2 \times 10^{(1)}$ (km) • $3{\cdot}2 \times 10^4 \div 1000$ or answer of 32 • $3{\cdot}2 \times 10^4 \div 1000 \div 8$ or answer of 4 • $3{\cdot}2 \times 10^4 \div 1000 \times 5$ or answer of 160 • $3{\cdot}2 \times 10^4 \div 8 \times 5$ or answer of 20 000 • $3{\cdot}2 \times 10^4 \div 1{\cdot}6$ or answer of 20 000 • One place value error (e.g. 2×10^x, $3{\cdot}2 \div 1{\cdot}6$).
20 or equivalent	A1	CAO.

End of solutions